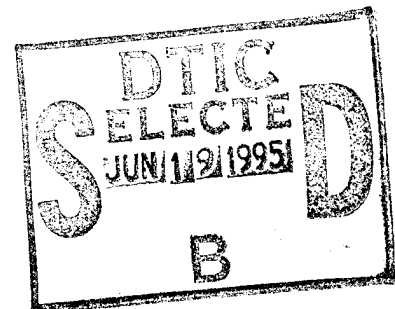


NAVAL POSTGRADUATE SCHOOL MONTEREY, CALIFORNIA



THESIS

A COMPARISON OF AMC CARGO CHANNEL
FLIGHTS AND ALTERNATIVE COMMERCIAL
AIR FREIGHT CARRIERS

by

Theresa A. Lewis

March 1995

Co-Advisors:

Dan C. Boger
Kenneth J. Euske

Approved for public release; distribution is unlimited.

19950615 020

DTIC QUALITY INSPECTED 6

REPORT DOCUMENTATION PAGEForm Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE March 1995	3. REPORT TYPE AND DATES COVERED Master's Thesis	
4. TITLE AND SUBTITLE A COMPARISON OF AMC CARGO CHANNEL FLIGHTS AND ALTERNATIVE COMMERCIAL AIR FREIGHT CARRIERS			5. FUNDING NUMBERS	
6. AUTHOR(S) Lewis, Theresa A.				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSORING / MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.				
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) The purpose of this thesis is to analyze and compare the air freight rate structure of commercial air freight carriers and the U.S. Air Force's Air Mobility Command (AMC) in a peacetime environment. Research was conducted on six commercial companies and AMC routes, structures, and services. AMC's channel flight system, operated over specific heavy shipment routes, was used as a baseline for comparison purposes. Associated air freight services are examined to address possible value added properties from a Department of Defense (DOD) perspective. From these analyses, a set of recommendations for utilizing AMC or commercial air freight assets for DOD air freight requirements is offered.				
14. SUBJECT TERMS AMC Cargo Channel Rates, Commercial Air Freight Carriers			15. NUMBER OF PAGES 118	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UL	

Approved for public release; distribution is unlimited

**A COMPARISON OF AMC CARGO CHANNEL FLIGHTS AND
ALTERNATIVE COMMERCIAL AIR FREIGHT CARRIERS**

by

Theresa A. Lewis
Lieutenant, United States Navy
B.S., United States Naval Academy, 1989

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL

March 1995

Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

Author:

Theresa A. Lewis

Theresa A. Lewis

Approved By:

Dan C. Boger

Dan C. Boger, Co-Advisor

Kenneth J. Euske

Kenneth J. Euske, Co-Advisor

David R. Whipple

David R. Whipple, Chairman
Department of Systems Management

ABSTRACT

The purpose of this thesis is to analyze and compare the air freight rate structure of commercial air freight carriers and the U.S. Air Force's Air Mobility Command (AMC) in a peacetime environment. Research was conducted on six commercial companies and AMC routes, structures, and services. AMC's channel flight system, operated over specific heavy shipment routes, was used as a baseline for comparison purposes. Associated air freight services are examined to address possible value added properties from a Department of Defense (DOD) perspective. From these analyses, a set of recommendations for utilizing AMC or commercial air freight assets for DOD air freight requirements is offered.

TABLE OF CONTENTS

I.	INTRODUCTION	1
	A. PURPOSE	1
	B. BACKGROUND	1
	C. THESIS OBJECTIVE	2
	D. RESEARCH QUESTIONS	3
	E. SCOPE AND LIMITATIONS	3
	F. RESEARCH LITERATURE AND METHODOLOGY	4
	G. ACRONYMS	4
	H. ORGANIZATION OF THESIS	4
II.	THE FEDERAL EXPRESS CORPORATION	5
	A. BUSINESS OVERVIEW	5
	B. OPERATIONS	6
	C. SERVICES	8
	1. Scope	8
	2. Domestic	9
	a. FedEx Priority Overnight® Service	9
	b. FedEx Standard Overnight® Service	9
	c. FedEx Economy Two-day™ Service	9
	d. FedEx® Overnight Freight Service	9
	e. FedEx® Two-Day Freight Service	10
	3. International	10
	a. International Priority® Service	11
	b. International Priority Plus®	11
	c. International Priority Distribution (IPD)® Service	11

d.	FedEx International Mail Service®	11
e.	FedEx International EXPRESSfreight® Service	11
f.	FedEx® International Airport-to- Airport Cargo Service	11
4.	Special	11
a.	SeaTiger® Service	12
b.	Flying Tigers® Air Cargo Services	12
c.	Air Charter Service	12
d.	Saturday Service	12
e.	Dangerous Goods SM	12
f.	FedEx C.O.D. Service	12
g.	Hold at FedEx Location Service	13
h.	Government Contract Service	13
i.	FedEx Business Logistics Services SM (BLS)	13
D.	PRICING	13
E.	FINANCIAL STRUCTURE	15
1.	Revenues	15
2.	Aircraft	17
3.	Other Assets	18
III.	AIRBORNE EXPRESS	21
A.	BUSINESS OVERVIEW	21
B.	OPERATIONS	22
C.	SERVICES	23
1.	Scope	24
2.	Domestic	24

a.	Express Delivery Service	24
b.	Select Delivery Service (SDS)	24
c.	Shipments Over 150 Pounds	24
d.	Letter Express and Select Delivery Service up to 8 Ounces	25
3.	International	25
a.	International Air Express Services	25
b.	Airport-to-Airport	25
c.	Door-to-Airport	25
d.	Door-to-Door	26
4.	Special	26
a.	Free Domicile	26
b.	Charter Aircraft	26
c.	Expedited Air	26
d.	Sea/Air	26
e.	Flight-Ready Express Service	26
f.	Hold at Airborne Express Service	26
g.	Sky Courier	27
h.	Vendor Sourcing	27
i.	Advanced Logistics Service Corporation	27
5.	Canadian Services	27
D.	PRICING	27
E.	FINANCIAL STRUCTURE	28
1.	Revenues	28
2.	Aircraft	29
3.	Other Assets	30

IV.	BURLINGTON AIR EXPRESS	31
A.	BUSINESS OVERVIEW	31
B.	OPERATIONS	32
C.	SERVICES	33
1.	Scope	33
2.	Domestic	33
a.	Overnight Service	33
b.	Second Day Service	34
c.	Next Flight Out Service	34
3.	International	34
a.	Time-Definite Premiere SM	34
b.	International Express	34
c.	Standard Airfreight	35
d.	Burlington Ocean Services SM	35
e.	IATA Services	35
4.	Special	35
a.	Burlington Direct SM	35
b.	Worldwide Customs Brokerage/ Imports Services	35
c.	Charters	36
d.	Sea/Air Express SM	36
e.	Euro-BAX SM	36
f.	Hazardous Goods Handling	36
g.	Fashion Services	36
h.	Security Courier Service through Brink's Air Courier	36
i.	Convention & Trade Show Services	37

j.	Government Services (USA)	37
k.	Burlington Global Logistics Services SM	37
5.	Canadian	37
a.	Domestic Canada	37
b.	U.S.A. To Canada Transborder	37
c.	Low Value Shipment Clearance (LVS)	37
d.	Canada to U.S.A. Transborder	38
e.	International Services	38
D.	PRICING	38
E.	FINANCE	39
1.	Revenues	39
2.	Assets	39
V.	EMERY WORLDWIDE EXPRESS	41
A.	BUSINESS OVERVIEW	41
B.	OPERATIONS	42
C.	SERVICES	43
1.	Scope	43
2.	Domestic	43
a.	Same Day	43
b.	Next Day	43
c.	Second Day	43
3.	International	44
a.	Express	44
b.	Preferred	44
c.	Standard Plus	44
d.	Standard	44

4.	Special	44
a.	Emery Customs Brokers	44
b.	Logistics Worldwide	45
c.	Quick Source Depot Program	45
d.	Charter Services	45
e.	Transportation Protective Services	45
f.	Customer Service Center	45
D.	PRICING	45
E.	FINANCE	46
1.	Revenues	46
2.	Assets	48
VI.	PRIVATE AIR FREIGHT COMPANIES	49
A.	DHL WORLDWIDE EXPRESS	49
1.	Business Overview	49
2.	Operations	50
3.	Scope of Services	50
4.	Domestic Service	50
5.	International Services	51
a.	DHL Worldwide Priority Express™	51
b.	International Document Service	51
c.	International Airfreight	51
6.	Special Services	52
a.	WorldMail®	52
b.	"Same Day" Service	52
c.	Faxlynx™	53
d.	Visa-Pak™	53

e.	24-Hour Customer Service	53
f.	Export Documentation Service	53
g.	Collect Billing	53
h.	Saturday, Sunday and Holiday Service	53
7.	Financial Structure	53
B.	UNITED PARCEL SERVICE (UPS)	54
1.	Business Overview	54
2.	Operations	55
3.	Scope of Services	55
4.	Domestic Services	55
a.	UPS Ground Service	56
b.	UPS Next Day Air Saver®	56
c.	UPS 2nd Day Air Service®	56
d.	UPS 3 Day Select SM	56
5.	UPS North America Service	56
6.	International Services	56
a.	Worldwide Express	56
b.	Worldwide Expedited	57
c.	UPS EuroExpress	57
d.	UPS EuroExpedited	57
7.	Special Services	57
a.	UPS Hundredweight Service SM	57
b.	UPS Ground Saver SM	57
c.	UPS GroundTrac®	57
d.	UPS Prepaid Letter Service	57
e.	UPS Saturday Delivery and Pickup	57

	f. UPS Worldwide Logistics, Inc.	58
	g. Hazardous Materials Service	58
	8. Financial Structure	58
VII.	AIR MOBILITY COMMAND	61
	A. GENERAL	61
	1. Background	61
	2. Operations	61
	B. CHANNEL FLIGHT OPERATIONS	63
	1. Scope	64
	2. Priority	64
	3. Commodities	67
	C. CHANNEL FLIGHT SERVICES	68
	D. CHANNEL CARGO RATES	69
	E. AMC BASIC AIRLIFT OPERATIONS STRUCTURE	70
VIII.	AMC CHANNEL AND COMMERCIAL AIR FREIGHT RATE COMPARISON	73
	A. GENERAL	73
	1. Route Structures	73
	2. Commodities Shipped	74
	3. AMC Rates	75
	4. Alternative Commercial Air Freight Carriers	75
	B. SCENARIOS	76
	1. Route One	76
	2. Route Two	77
	3. Route Three	78

4. Route Four	80
5. Government Tender Rates	81
IX. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS . . .	83
A. SUMMARY	83
B. CONCLUSIONS	83
C. RECOMMENDATIONS	86
APPENDIX A. ACRONYMS	87
APPENDIX B. AIR FREIGHT DATA MATRIX ¹	91
LIST OF REFERENCES	93
BIBLIOGRAPHY	97
INITIAL DISTRIBUTION LIST	99

LIST OF TABLES

Table 1.	Federal Express Operating Data FY 94 and 93	8
Table 2.	Service Revenues by Service Provided (dollars in thousands)	15
Table 3.	U.S. Domestic Express Package Services (dollars in millions)	16
Table 4.	International Services (dollars in millions)	17
Table 5.	Federal Express Aircraft Fleet	18
Table 6.	Financial Structure FY 94 and 93 (dollars in thousands)	19
Table 7.	Airborne Express Shipment, Revenue and Weight Trends (number of shipments	23
Table 8.	Financial Operating Results (dollars in thousands)	29
Table 9.	Financial Structure for FY 93 and 92 (dollars in thousands)	30
Table 10.	Financial Results for FY 93 and 92 (dollars in thousands)	39
Table 11.	Financial Results for FY 1993/1992 and 1ST/2ND Quarter 1994 (dollars in thousands)	47
Table 12.	UPS' Financial Structure (dollars in thousands)	58
Table 13.	Cargo Traffic Moved FY 93 by Priority Category (in short tons)	66
Table 14.	DOD Cargo Channel Traffic Rates for Specified Routes (Cargo/pounds (Cents per pound)	71
Table 15.	Selected Channel and Cargo Routes	73
Table 16.	AMC'S Rates for Selected Commodities Per Route (Charges rounded to nearest whole dollar)	75

Table 17.	Route One (SC-Panama) Price Quotes	76
Table 18.	Route Two (DE-Germany) Price Quotes	78
Table 19.	Route Three (CA-Korea) Price Quotes	79
Table 20.	Route Four (CA-Hawaii) Price Quotes	80

I. INTRODUCTION

A. PURPOSE

The purpose of this thesis is to analyze and compare the air freight rate and service structures of commercial air freight carriers and the U.S. Air Force's Air Mobility Command (AMC) in a peacetime environment. Air freight services are examined to address value added from a Department of Defense (DOD) perspective. From these analyses, a set of recommendations for utilizing AMC or commercial air freight assets for DOD air freight requirements are offered.

B. BACKGROUND

Commercial air freight companies are becoming more cost-efficient due to expanding worldwide competition. The growing importance of companies fostering "just-in-time" production schedules has made "express" shipping of material and products a transportation requirement for the present and future (Muller, 1989, p. 3). This new cost efficiency offers potential cost savings to DOD agencies requiring air cargo services.

The commercial freight industry typically focuses on express mail and package shipments as well as heavy freight services. It appears that most companies specialize in express shipping for mail and packages while providing freight forwarding services for heavy shipments. Few companies specialize in heavy air freight services only, but most will accommodate virtually any size or weight shipments within the limitations of the available aircraft.

Rate structures for express package and mail services are usually published by the company for shipments up to 100 or 150 pounds. Customer rate quotations for frequent shipping, significant quantities, or significant weight tend to be negotiated downward. Freight services are usually required

for single piece items over 150 pounds and large size/weight shipments.

The Department of Defense (DOD) has been emphasizing commercialization of comparable defense functions. The defense air freight function, operated through the Air Force's Air Mobility Command (AMC), is a candidate for at least partial commercialization. AMC's air transportation services, provided to the DOD through their scheduled channel flight missions and Special Assignment Air Missions, are comparable to the commercial industry's regular air freight services and charter flights, respectively.

Competitive commercial air freight rates are affecting the cost effectiveness of AMC cargo flight operations during peacetime. The commercial air freight industry is expanding worldwide and is offering improved services and lower rates to their customers. AMC is struggling to compete with the rates and services offered by commercial air freight companies in a peacetime environment. However, AMC is unparalleled in its ability to carry outsized cargo with C-141, C-5 and C-17 aircraft. The commercial industry does not employ these types of aircraft, and the carriers are limited to the constraints of their aircraft fleets.

C. THESIS OBJECTIVE

Analysis of AMC's international air channel cargo rates and commercial air freight rates will provide a basis for recommendations that have the potential for significant peacetime cost savings. Special DOD requirements, including oversized cargo, hazardous materials, and classified material safeguards, are compared and analyzed using both commercial and AMC services. These comparisons will demonstrate how much of a differential in freight rate pricing exists between AMC and commercial carriers. Other air freight services offered by commercial carriers will be examined for value added

properties. Supporting conclusions and recommendations based on analyses of the research are presented.

D. RESEARCH QUESTIONS

The primary research question of this thesis is:

- How do commercial air freight rates, route structures and services compare to AMC's channel flight system for air cargo?

The subsidiary research questions are:

- Which commodities offer the greatest potential cost savings for DOD when shipped by commercial carriers?
- Which commodities offer the greatest potential cost savings for DOD when shipped by AMC assets?
- What is the implication of DOD's commercial air freight usage on wartime airlift requirements?

E. SCOPE AND LIMITATIONS

This thesis compares and analyzes commercial air freight industry rates with AMC cargo channel rates over comparable routes. Research was conducted on six commercial air freight companies and AMC focusing on routes, structures, and services. AMC's channel flight system, operated over specific heavy shipment routes, was used as a baseline for comparison purposes. Six different commodities were evaluated over four comparable routes. The commodities selected were representative of DOD special handling requirements, including hazardous material, oversized cargo, and classified material security cargo.

This thesis identifies potential opportunities for significant DOD peacetime cost savings by utilizing commercial air freight companies for continental United States (CONUS) to outside of continental United States (OCONUS) destinations, including Hawaii. This thesis also identifies advantages AMC has over commercial operations in specific situations.

Analysis of commercial and AMC air freight rates and services are limited to selected scenarios, and actual

shipments of material were not attempted. Scenarios were developed to demonstrate capabilities and limitations of carriers for shipping cargo with special handling requirements. Rate quotes were based on estimates; written verifications were not available.

F. RESEARCH LITERATURE AND METHODOLOGY

Research data for commercial carriers were obtained from published industry service guides, fiscal year annual reports including Form 10-Ks, company literature, journals, and personal telephone interviews. AMC data were obtained from Government reports, directives, regulations, manuals, journals and personal telephone interviews. Information on air freight carriers was obtained from the headquarters and service agents of Federal Express, Burlington Air Express, Airborne Express, Emery Worldwide, United Parcel Service (UPS) and DHL. Information on AMC background and cargo channel flight operations was obtained from the Air Mobility Command (AMC).

Air freight commodity research was conducted via telephone interviews with cognizant air cargo services and rate information personnel. Cargo dimensions and typical air cargo shipment specifics were obtained from the Naval Aviation Depot in Alameda, California and the U.S. Army Tank Automotive and Armaments Command (TACOM) in Warren, Michigan.

G. ACRONYMS

A listing of acronyms associated with commercial air freight and AMC subjects is presented in Appendix A.

H. ORGANIZATION OF THESIS

This thesis is organized into nine chapters with Chapters II through VI examining six commercial air freight companies, Chapter VII examining AMC, Chapter VIII comparing and analyzing AMC/commercial rates and services, and Chapter IX offering conclusions and recommendations. Acronyms are listed in Appendix A, and an air freight data matrix is depicted in Appendix B.

II. THE FEDERAL EXPRESS CORPORATION

This chapter discusses the Federal Express Corporation's scope of business operations, services, pricing, and financial structure. Review of these areas is required to understand the composition of a major commercial air freight industry and how it operates.

A. BUSINESS OVERVIEW

Federal Express (FedEx) is a global service express transportation company that offers a wide range of services for the time-definite delivery of documents, packages and freight throughout the world. These services are provided by an extensive fleet of aircraft, vehicles, and leading-edge information technologies. FedEx also provides service for less time-sensitive shipments and special handling for dangerous goods and materials.¹ (Moody's, FedEx, 1994)

The Federal Express Corporation is a publicly owned company that was incorporated in Delaware on June 24, 1971, and began its operations in 1972. It employs over 66,000 permanent full-time and 35,000 permanent part-time employees. Labor unions have attempted to initiate and organize groups within the Federal Express organization, however, FedEx strongly opposes those attempts. (FedEx 10K, 1994, p. 8)

During fiscal year 1994,² Federal Express adopted its new brand name "FedEx." They also improved their global network of aviation, ground and information links among the major

¹Dangerous goods or Hazardous Material (HAZMAT) is considered to be a substance or material which has been determined to be capable of posing an unreasonable risk to health, safety, and property when transported. This material includes gases, explosive, flammable items or substances, poisons, corrosive and radioactive substances. (DOD 4500.32-R, p. A-7)

²FedEx's fiscal year 1994 is from June 1, 1993 to May 31, 1994.

trading centers in the Americas, Europe and Asia. The company introduced new technologies and services to better serve their customer base (e.g., systems to enhance their advanced sorting and tracking equipment and introduction of International Priority Freight Service). FedEx's latest aircraft acquisition is the Airbus A300. (FedEx 10K, 1994, p. 1)

Business volume and tempo of operations tends to be seasonal in the air package and freight industry. Federal Express expects their express package business to increase in November and December of each year. While their international business, especially in the Asia-to-U.S. routes, peaks in October and November, due to holiday sales to merchandisers. The Corporation's third fiscal quarter and late summer are lower volume periods. (FedEx 10k, 1994, p. 4)

FedEx faces competition in both the overnight express market and the international freight market. United Parcel Service (UPS) and Airborne Express are FedEx's primary competition in the overnight express market. The international freight market is shared with foreign national air carriers, U.S. passenger airlines, all-cargo airlines, and express package companies. Specifically, FedEx's top competitors in the international freight market are UPS and DHL Worldwide. (FedEx 10K, 1994, p. 6)

B. OPERATIONS

Federal Express operates its global transportation and distribution network through management of numerous aviation and ground transportation assets and operations. Their operations are capital intensive with investments in 462 aircraft, over 30,000 vehicles, as well as other sorting facilities and stations, Business Service centers, manned and unmanned Mini Centers, and Drop Boxes. (FedEx 10K, 1994, p. 4)

Federal Express' primary domestic sorting facility, the SuperHub located in Memphis, Tennessee, serves as the center of the Company's multiple hub-and-spoke domestic system. A

second national hub is located in Indianapolis, Indiana. In addition to these hubs, the company operates two regional hubs and two sorting facilities in the U.S. A facility in Anchorage, Alaska, serves as a sorting facility for express package and freight traffic moving to and from Asia, Europe and North America. Major international sorting and freight handling facilities are located in Japan, France, and the United Kingdom. (FedEx 10K, 1994, p. 4)

FedEx maintains several sophisticated package tracking, billing and communications systems. Their advanced automated package and billing system is called COSMOS[®], which uses hand-held scanners, linked to a satellite system, that automatically and continuously updates shipment location status. In addition, FedEx provides its high-volume customers a software program called POWERSHIP[®], allowing customers to track their shipments directly through COSMOS[®]. Other FedEx provided software is available for customers tracking fewer shipments. FedEx also offers ExpressClearSM services, which automates the customs clearance process.

The total volume of express packages and air freight for fiscal year 1994 (FY 94) and 1993 (FY 93) was approximately 1,721,244.64 tons and 1,526,339.07 tons, respectively.³ Table 1 depicts more detailed FedEx operating statistics.

³A ton in this reference is equivalent to a short ton measure of 2,000 pounds.

	1994	1993
Express Packages:		
Average daily package volume	1,925,105	1,710,561
Average pounds per package	6.0	5.8
Average revenue per pound	\$2.48	\$2.60
Average revenue per package	\$14.95	\$15.17
Air Freight:		
Average daily pounds	1,844,270	2,050,033
Average revenue per pound	\$1.06	\$1.09
Operating Weekdays	257	255

(FedEx Annual Report, 1994, p. 17)

Table 1. Federal Express Operating Data FY 94 and 93

C. SERVICES

1. Scope

FedEx service offerings are global in scope with delivery to over 180 countries. FedEx offers three domestic overnight delivery services, two domestic second-day services, five international document and package delivery services, two international freight services, and many special services including their commercial and military charter services. FedEx also participates in the Civil Reserve Air Fleet ("CRAF") program for cargo shipments. They discontinued their military passenger flights in September of 1992. (FedEx 10K, 1994, p. 3)

2. Domestic

Federal Express divides domestic services into two distinct categories. FedEx Priority Overnight[®], FedEx Standard Overnight[®] and FedEx Economy Two-day[™] services apply to those shipments that weigh up to 150 pounds. Anything over 150 pounds or considered to be an extra-large package⁴ by the company, will be treated as a freight shipment. These same services apply to Hawaii, Alaska and Puerto Rico as specified, but delivery times are later due to geographic area designations. (FedEx SG, 1993, pp. 7-8.)

a. FedEx Priority Overnight[®] Service

This is FedEx's fastest service for those shipments that require next day delivery before noon. Delivery is promised by 10:30 a.m. the next business day in "AA" designated service areas and by noon in "AM" designated areas.

b. FedEx Standard Overnight[®] Service

FedEx offers this economical, overnight option for shipments that are not as time-sensitive and need only afternoon delivery. Delivery by 3 p.m. the next business day in "AA" service areas, and by 4:30 pm in "AM" areas. (areas are listed in FedEx's worldwide directory). Saturday delivery is not available with this service.

c. FedEx Economy Two-day[™] Service

This is FedEx's money saving option for less time-sensitive shipments. Delivery by 4:30 pm the second business day within the continental U.S. is guaranteed.

d. FedEx[®] Overnight Freight Service

FedEx offers next-business-day freight service to destinations in the continental U.S., Alaska and Puerto Rico. Delivery is scheduled by noon or 4:30 p.m. the following

⁴"Extra-large packages" are those packages exceeding 119" in length, and 165" in length plus girth combined (for Puerto Rico shipments, limitations are 108" and 130"). Girth (G) is calculated by length (L), Height (H) and Width (W). [G = L + (2xH) + (2xW)].

business day, depending on destination. This service is designed for shipment pieces weighing 151 to 750 pounds each. Shipments that exceed 750 pounds will be accepted when advance approval is obtained.

e. FedEx® Two-Day Freight Service

FedEx provides second-day-business delivery of freight to destinations in the continental U.S., Alaska, Puerto Rico, and Oahu, Hawaii by 4:30 p.m. The Two-Day Freight Service is designed for shipment pieces weighing 151 to 1500 pounds each, more with advance approval.

3. International

FedEx international services are based on customs declared value, type shipments, and commodity limitations imposed by authorities in the destination country.⁵ Single pieces that weigh over 150 pounds are considered freight by FedEx and are addressed under freight services. For express shipments, size and per-package weight limits may vary by country; therefore, packages or shipments over a specified country's size/weight restrictions may require freight service. The same international limitations may also apply to freight. (FedEx SG, 1993, pp. 45-47)

FedEx designates anything over 150 pounds as freight, which is controlled under FedEx freight services. Transit times for expected freight delivery may vary by destination due to the international dateline, customs clearance and other regulatory delays imposed by the destination country. Shipments can also be subject to certain restrictions (e.g., weight) and advance notification as well. (FedEx SG, 1993, pp. 67-72)

⁵Typically most countries allow for declared custom values of up to US\$25,000. FedEx has services (i.e., International Priority Broker Selection OptionSM) that will allow for this option in countries that typically do not. (Bangladesh and Oman are restricted to \$5,000). (FedEx, SG, 1993, pp. 45-46)

a. International Priority® Service

This FedEx Service offers fast, customs cleared, door-to-door delivery of documents and packages up to 150 pounds per piece, with no weight limit on the total shipment (except to Argentina and Indonesia) in one to three days.

b. International Priority Plus®

FedEx provides overnight delivery service of documents and packages weighing up to 70 pounds from New York City to major European cities.

c. International Priority Distribution (IPD)® Service

FedEx offers this service to provide fast, customs-cleared, door-to-door delivery of bulk shipments to multiple consignees in a single country.

d. FedEx International Mail Service®

This FedEx service provides fast, cost-effective delivery of international mail to Europe, Asia, Canada, Latin America, the Middle East, Australia and Africa.

e. FedEx International EXPRESSfreight® Service

International EXPRESSfreight provides flexible, time definite delivery in one to three days of virtually any size freight shipments to U.S. and major world markets. An air waybill is required for customs.

f. FedEx® International Airport-to-Airport Cargo Service

FedEx offers this economical option that provides international delivery of virtually any size freight shipments in two to four days. An International Air Transport Association (IATA) air waybill is required for customs.

4. Special

This section will address special cargo services and service options available. (FedEx SG, 1993, pp. 60-64)

a. *SeaTiger[®] Service*

FedEx provides a combination of sea transportation and air-cargo service on shipments between Asia and Europe or Latin America.

b. *Flying Tigers[®] Air Cargo Services*

FedEx offers this special, live animal cargo service. The service provides airport-to-airport services worldwide.

c. *Air Charter Service*

FedEx provides dedicated cargo aircraft services for a one-time mission or long-term basis.

d. *Saturday Service*

FedEx offers Saturday service for several of their services including FedEx Priority Overnight, Standard Overnight, and Economy Two-Day Service. A ten dollar special handling fee applies to packages picked up or delivered on Saturday. Saturday pickup is not available for Overnight Freight and Two-Day Freight services.

e. *Dangerous GoodsSM*

FedEx provides a limited hazardous materials service for customers in accordance with IATA regulations and Title 49 Code of Federal Regulations (CFR) for shipment of hazardous material and dangerous goods aboard commercial aircraft. Dangerous Goods Service is available throughout the U.S. and to many international FedEx designated destinations. Domestic services require a ten dollar special handling fee where per-package pricing applies and an order shipment fee where hundred weight pricing applies. International Priority service requires a \$40 handling fee per shipment. International EXPRESSfreight Service or Airport-to-Airport Cargo service fees vary by destination.

f. *FedEx C.O.D. Service*

FedEx offers this Collect on Delivery Service for customers shipping within the U.S. and Federal Express collects payments (check or money order) at time of delivery

for the customer. Once the shipment is delivered the payment is returned to the shipper within one or two business days (FedEx 10K, 1993, p. 2).

g. Hold at FedEx Location Service

This service is provided for customers who prefer to pick up their own shipment at a FedEx Service Center location. This service allows the customer to pick up a shipment before it would be delivered by FedEx. When freight is specified "hold" (packages over 150 pounds), customers are eligible for a discount.

h. Government Contract Service

FedEx is a U.S. Government approved carrier for next-day delivery of documents and packages.⁶

i. FedEx Business Logistics ServicesSM (BLS)

This division is the company's high-tech inventory management and distribution facilities subsidiary. BLS is linked by a computerized inventory management system to provide Customer Support Center agents global visibility of inventory management. BLS also allows FedEx to provide an extended array of support services to their customers. (FedEx SG, 1993, p. 75)

D. PRICING

Domestic shipping rates are based on the service selected, weight, size, ancillary service charges, and whether or not the shipment is picked up by a company courier or dropped off by the customer at a FedEx location. International rates are based on the type of service provided and vary with size, weight and destination. Volume discounts are based on actual or potential average daily revenue produced.

⁶Under General Services Administration Contract No. GS-OOF-13300, government shippers are allowed to call FedEx for pick up and next-day delivery of documents and packages throughout the 50 states and Puerto Rico. Drop off shipments, holding services, sending dangerous goods, and other shipping needs are available. (FedEx SG, 1993, p. 63)

The more revenue a particular customer produces, the greater the discount.

Freight service rates apply to packages or pieces weighing over 150 pounds and are published by FedEx. International Priority Rates are published; however, other international freight shipment rates can be obtained through FedEx service agents. Rates for pieces under 150 pounds are published by FedEx, and are determined by package weight, service required and whether shipped domestically or internationally. For multiple piece shipments with a total weight of less than 100 pounds being shipped to one destination on a single air bill, prices are determined either on a price-per-package basis or a price-per-total shipment weight (hundred weight) basis. The customer is billed on the lower of the two rates. For multiple piece shipments over 100 pounds, hundred weight pricing is automatic.

Dimensional weight pricing is applied to those packages that exceed a certain size. These charges are based on volumetric standards and calculated for shipments within the U.S. by multiplying the length by the width, then by the height (in inches) of each package and dividing by 194. Dimensional pricing for international shipments are based on the International Air Transport Association (IATA) volumetric standards, and is calculated the same as the domestic method but is divided by 166. Dimensional weight charges are assessed if the dimensional weight charges exceed the actual weight charges. FedEx considers extra-large packages as freight service shipments and will charge those packages at a freight rate. A minimum freight rate equal to that of a 30 pound package will be charged, even if the billable weight is less than 30 pounds.

Special handling fees may be assessed if special services are required for a shipment, e.g., Saturday pickup or

delivery, dangerous goods, Declared Value Charge⁷. (FedEx SG, 1993, pp. 125-141)

E. FINANCIAL STRUCTURE

1. Revenues

Federal Express' domestic revenues account for 73 percent of the company's 1994 total revenue base. FedEx made significant improvements through their international operations. These operating results contributed a fiscal earnings improvement of \$153 million over FY 1993. The company attributes this performance to the restructuring efforts of their European operations, the upgrading of their intercontinental aircraft fleet, and expanding their service reach to 187 countries. Table 2 depicts FedEx's total service revenues by year and service category. (FedEx, Annual Report, 1994, p. 18)

	1994	1993	1992
Priority Overnight	\$3,707,974	\$3,433,106	\$3,342,956
Standard Overnight	1,166,808	1,013,076	841,439
Two-Day	1,091,511	968,780	786,837
Domestic Freight	113,939	87,365	74,284
Int'l Priority	1,317,856	1,116,589	1,039,337
Int'l Freight	504,738	570,154	699,939
Charter	113,446	112,416	188,165
BLS and other*	463,184	506,557	577,103
Total	\$8,479,456	\$7,808,043	\$7,550,060

* Includes revenues generated by specialized services such as transportation and logistics management as well as other innovative services. (FedEx 10K, 1994, p. 4)

**Table 2. Service Revenues by Service Provided
(dollars in thousands)**

⁷This is assessed for shipments valued over \$100. It represents the company's maximum liability for any loss, damage, delay, misdelivery, nondelivery, misinformation, or any failure to provide information. Depending on the type of cargo being shipped, FedEx's maximum liability is a declared value not to exceed a per-package limit of \$500 or \$25,000. Declared value limitations also vary with the international destination.

Table 3 depicts FedEx statistics from domestic express services provided.

	1994	1993
Revenues	\$6,200	\$5,668
Operating income	560	559
Operating margin	9.0%	9.9%
Express package stats:		
Average daily package (000)	1,792	1,596
Revenue per package	\$13.20	\$13.32
Package mix		
Priority Overnight	49%	51%
Economy Two-Day	26%	24%
Standard Overnight	25%	25%

(FedEx Annual Report, 1994, p. 28.)

**Table 3. U.S. Domestic Express Package Services
(dollars in millions)**

Table 4 depicts statistics from international operations.

	1994	1993
Revenues:		
International Priority Services (IP)	\$1,318	\$1,117
International EXPRESSfreight (IXF) and Airport-to-Airport (ATA)	505	570
Charter	113	112
International BLS and other	344	341
TOTAL	\$2,280	\$2,140
Operating Loss	\$ (29)	\$ (182)
Operating Margin	(1.3)%	(8.5)%
Express Air Freight Statistics:		
Average daily IP packages (000's)	133	115
Revenue per package	\$38.60	\$38.18
Average daily air freight pounds (000's)	1,844	2,050
Revenue per pound	\$1.06	\$1.09

(FedEx Annual Report, 1994, p. 30)

Table 4. International Services
(dollars in millions)

2. Aircraft

FedEx maintains a fleet of 462 aircraft, of which 59 are leased. Table 5 depicts the type, number, and payload for each aircraft fleet.

DESCRIPTION	NUMBER	PAYLOAD (POUNDS)
Boeing B747-200	6	250,000
McDonnell Douglas MD-11	13	198,500
McDonnell Douglas DC-10-30	20	172,000
Airbus A300-600	4	117,700
McDonnell Douglas DC-10-10	11	105,000
Airbus A310-200	1	74,200
Boeing B727-200	90	59,500
Boeing B727-100	69	46,000
Fokker F-27-500	24	14,000
Fokker F-27-600	8	12,500
Cessna 208B	206	3,460
Cessna 208A	10	2,960

(FedEx 10K, 1994, p. 9)

Table 5. Federal Express Aircraft Fleet

3. Other Assets

FedEx owns approximately 30,900 ground transport vehicles. This includes pickup and delivery vans, container transport vehicles, and over-the-road tractors and trailers (FedEx 10K, 1994, p. 4).

The company leases ten sorting and handling facilities, facilities for administrative and technical operations, 64 facilities in Memphis for corporate headquarters and support operations, 762 city stations in the U.S., a portion of the 161 international city stations, 285 domestic stand-alone Mini-Centers, 406 U.S. service centers, and space for 311 international service centers. (FedEx 10K, 1994, pp. 10-11)

FedEx also owns three of the seven administrative and technical facilities, 14 of the 776 city station operations in

the U.S., a portion of the 161 international city stations, and approximately 29,676 domestic and 733 international drop boxes. (FedEx 10K, 1994, pp. 9-11) Additionally, FedEx U.S., operates 41 "call centers" worldwide to answer customer questions (FedEx SG, 1993, p. 7). Table 6 depicts FedEx's property and equipment status for FY 94 and 93.

	1994	1993
Property and Equipment	\$3,449,093	\$3,476,268
Total Assets	5,992,498	5,793,064

(FedEx Annual Report, 1994, p. 17)

Table 6. Financial Structure FY 94 and 93
(dollars in thousands)

III. AIRBORNE EXPRESS

This chapter discusses the Airborne Freight Company's scope of business, operations, services, pricing, and financial structure. Review of these areas gives insight to understanding the composition of a major commercial air freight industry and its operations.

A. BUSINESS OVERVIEW

Airborne Freight Company, or Airborne Express if referred to by their trade name, is an air express company and air freight forwarder⁸ that expedites shipments of all weights and sizes to destinations throughout the United States and most foreign countries.

This company was incorporated in Delaware on May 10, 1968. ABX Air Inc. is the company's wholly-owned subsidiary, which was incorporated January 22, 1980. ABX provides domestic express cargo service and service to Canada. The company acts as a domestic and international freight forwarder also. This company-owned airline owns an airport and central sorting facility in Wilmington, Ohio. Airborne Express employs 9,500 full-time employees (4,100 are under union contract) and 6,300 part-time and casual employees (2,800 under union contract).

Federal Express is Airborne's dominant competitor in the domestic express business, followed by United Parcel Service. Airborne ranks third in shipment volume behind these two companies in the domestic express business. In addition to FedEx and UPS, the company competes with DHL Worldwide Express, TNT Express Worldwide and other air freight

⁸A freight forwarder is a carrier who collects shipments, consolidates them, and selects a mode of transportation to transfer these consolidated shipments to the destination where the shipment is then delivered to the receiver. (Muller, 1989, p. 207)

forwarders or carriers and most commercial airlines in the international markets. (Airborne 10K, 1993, pp. 9-10)

B. OPERATIONS

The company's domestic express freight service is primarily operated through their airline system. As a freight forwarder, Airborne Express also uses available capacity to ship cargo that would normally be moved on other carriers (Airborne 10K, 1993, p. 2). This system provides a nightly lift capability of about 2.8 million pounds. This recorded capability is compared to the end of 1992 and 1991 which was 2.4 million and 2.1 million, respectively. Airborne, over the years, has maintained the utilization of available lift capacity exceeding 80 percent. (Airborne 10K, 1993, pp. 4-5)

Airborne's network of exclusive service arrangements with independent freight and express agents provides service to international locations that are not served by company-owned operations. They augment existing commercial airline lift capacity with their own domestic network for overseas movement of cargo. (Airborne 10K, 1993, p. 7)

The company's facilities are linked to a proprietary freight tracking and message computer system called FOCUS. FOCUS provides the ability to monitor overall system performance and maintain shipment status data. (Airborne 10K, 1993, p. 2) An electronic data interchange (EDI) program called "Customer Linkage" was developed for Airborne's highest volume customers and provides tracking and billing services. For their high volume customers, Airborne provides a metering device system called LIBRA II which is installed at the customer's place of business. Both of these systems automatically transfer shipment data to Airborne's FOCUS system to avoid duplicate data entry. (Airborne 10K, 1993, p. 8)

Airborne's domestic shipments account for almost 97 percent of their total shipments in 1993. Up to 99 percent of

shipments are utilized in an express capacity. Table 7 depicts the number of shipments in 1993 and 1992 by service performed. Average pounds per shipment and revenue per pound are also shown. Over 468 thousand tons of letters, packages, and freight (over 100 pounds) were shipped in 1993.

	1993	1992	Ave lb/ Shipment	Ave Rev/ lb.	Ave Rev/ Shipment
Domestic shipment			4.8 (FY93) 4.8 (FY92)	\$1.94 \$2.04	\$9.25 \$9.68
Over- night	109,863	96,715			
SDS	50,355	33,136			
110 pounds & over	350	335			
Total	160,568	130,186			
Interna- tional			47.1 (93) 46.7 (92)	\$1.41 \$1.46	\$66.35 \$68.00
Express	3,139	2,886			
All other	406	416			
Total	3,545	3,302			
TOTAL	164,113	133,488			

(Airborne Annual Report, 1993, p. 17)

Table 7. Airborne Express Shipment, Revenue and Weight Trends (number of shipments in thousands)

C. SERVICES

Airborne Express provides delivery of time-sensitive documents, letters, small packages and heavy freight throughout the U.S. and many foreign countries. The company serves every zip code within the U.S. (over 45,000 communities) and

200 countries worldwide (Moody's, Airborne, 1994). Airborne is currently not a participant of the CRAF program (CRAF, 1994).

1. Scope

The company's primary domestic operation is door-to-door express delivery of small packages weighing less than 100 pounds. Their international express door-to-door services are intended for movement of non-dutiable and certain dutiable shipments weighing less than 99 pounds. International freight services handle the heavier shipment weights. Airborne ships hazardous material and dangerous goods as allowed by IATA. Airborne Express provides domestic, Canadian, and international services while providing an array of special services to augment customer needs.

2. Domestic

Door-to-door service is provided for most services unless otherwise specified. Pickup service is included free from most U.S. locations. (ASG, 1994, pp. 13-15)

a. Express Delivery Service

This service provides next business morning delivery for shipments up to 150 pounds. Packages picked up Friday or Saturday will be delivered on Monday unless Saturday delivery service is requested.

b. Select Delivery Service (SDS)

This service provides for next afternoon or second day delivery for shipments under 150 pounds. Shipments from Letter Express® (size up to 5 pounds maximum) will be delivered by 3 p.m. of the business day following shipment. Shipments over five pounds will be delivered by 5 p.m. one business day later than Express delivery. SDS is not available for shipments to Alaska or Hawaii.

c. Shipments Over 150 Pounds

Airborne can handle shipments of practically any size or weight. Delivery times may vary for shipments over

150 pounds (Consultation with service center will be required).

d. Letter Express and Select Delivery Service up to 8 Ounces

This is their most economical service. It assures delivery the next business day.

3. International

Airborne provides express services to over 200 countries. International air freight forwarding services are provided for airport-to-airport, door-to-airport, and door-to-door shipment delivery. (ASG, 1994, pp. 25-29)

a. International Air Express Services

Delivery is provided generally within 24 to 96 hours. This service includes customs clearance and delivery to the receiver's door. For most destinations that Airborne serves, there is no limit on the total weight of a shipment; however, no one piece can weigh more than 99 pounds. This weight may also vary by the destination country. Pieces weighing over 99 pounds will be treated as freight and are eligible for shipment by one of Airborne's international air freight services. This service is for dutiable shipments with a maximum commercial value up to US\$25,000. Dutiable shipments are generally defined by each country.

b. Airport-to-Airport

This service provides movement of international freight shipments from an airport near the customer to the destination airport. Customs services are available. The receiver is responsible for charges incurred at the destination.

c. Door-to-Airport

This service moves shipments from the customer's location to the nearest destination airport. Airborne notifies the customer's or consignee's broker upon arrival.

d. Door-to-Door

The price for this service is based on one, all-inclusive rate to the destination airport. The receiver is responsible for additional charges such as airport fees, duties, and taxes incurred at the destination.

4. Special

This section will address special cargo services and service options available. (ASG pp. 14-16, p. 29)

a. Free Domicile

This service is available for customers who prefer to assume the responsibility for payment of all charges door-to-door.

b. Charter Aircraft

This service provides an exclusive use of an aircraft required for extra large shipments that need expedited movement and cannot wait for a regularly scheduled flight.

c. Expedited Air

This service provides movement of critical freight shipments on a next-flight-out basis.

d. Sea/Air

This is Airborne's most cost effective service. Shipments are moved using both surface and air routes.

e. Flight-Ready Express Service

Airborne's service that allows the customer the advantage of paying for flight service in advance. This prepurchase packaging has no expiration date. This service cannot be used for Saturday pickup/delivery or international shipments.

f. Hold at Airborne Express Service

This service allows the receiver the option of accepting a shipment at local Airborne Express office (e.g., the customer wants to accept a shipment earlier than the company's scheduled delivery).

g. Sky Courier

This provides same-day, next-flight-out service through the use of the world's commercial airlines 24 hours a day, 365 days a year. Airborne utilizes Sky Courier (An independent subsidiary of Airborne Express) for nationwide, door-to-door air service to the customer who needs faster delivery than other services provide.

h. Vendor Sourcing

Airborne will coordinate with vendors and arrange to pick up customer purchases from a variety of individual suppliers, then consolidate shipments into one economical movement to the customer's location. This reduces overall transportation costs.

i. Advanced Logistics Service Corporation

Airborne Express Logistics Services, known as Advanced Logistics Service (ALS) Corporation, is a subsidiary of Airborne Freight Company. ALS provides a number of logistics management services for its customers including various warehousing and inventory programs for customer or company management.

5. Canadian Services

Express services to and from Canada are provided for any letter envelope or package up to 99 pounds. For shipments heavier than 99 pounds, freight services to Canada are available. (ASG, 1994, pp. 39-40)

D. PRICING

Airborne's express service rate schedules are based on a price-per-package according to weight up to 100 pounds domestically and 20 pounds internationally. Any domestic shipment over 100 pounds is then assessed by the company's 100 plus rate structure.⁹ International express shipments charge \$4.00

⁹100 plus rates are based on per shipment per 100 pounds. Example: Rate for shipping 105 pounds = (already published rate at 100 pounds for service provided x 1.05).

per pound over 20 pounds. (Airborne Rate Schedule, 1994) Dimensional weight pricing is applied to unusual size shipments. The greater of the dimensional or actual rate price will be applied.

Charges for a domestic shipment with cubic measurements exceeding 194 cubic inches per pound will be based on one pound for each 194 cubic inches. Charges for international shipments with cubic measurements exceeding 166 cubic inches per pound will be based on one pound for each 166 cubic inches. Volume charges for Canadian and Puerto Rico shipments are based on one pound for each 184 cubic inches. Fractions of a pound are charged the next higher pound.

International freight (including pieces over 99 pounds) rates are negotiable and available for spot quotes by a company representative. Discount programs are available to customers who ship regularly or on a high volume basis. The company's strategy is to provide low cost express services for high volume corporate customers. (Airborne 10K, 1993, p. 1)

Airborne's rates are also subject to ancillary service charges and will be assessed if special handling services are required, e.g., dangerous goods, declared value charges, Saturday and holiday service.

E. FINANCIAL STRUCTURE

1. Revenues

Airborne's operating performance in 1993 strongly improved over previous years. This is a result of increasing domestic shipping, revenue growth and company endeavors to lower operating costs per shipment. (Airborne Annual Report, 1993, p. 17).

Airborne's financial conditions for the past three years have been dependent on their ability to associate capital expenditures with the financing of those expenditures. In FY 93, Airborne took measures to reduce capital expenditures by evaluating expansions of facilities and use of aircraft. In

fact for FY 93, Airborne's capital expenditures were over \$100 million less than in FY 92 and 91. (FY93: \$139 million, FY92: \$252 million, FY91: \$246 million). Airborne considers their management of capital expenditures to be a significant factor in the company's financial success over the last three years. (Airborne Annual Report, 1993, p. 19) Table 8 provides financial data of the company's operating results in FY 93 and 92.

	1993	1992
Revenues		
Domestic	1,484,787	1,259,792
International	235,194	224,524
Total	1,719,981	1,484,316
Operating expenses	1,636,861	1,456,45
Earnings from operations	83,120	27,866
Earnings before tax and changes in acct	59,027	9,087
Net earnings	39,117	5,157

(Airborne Annual Report, 1993, p. 16)

Table 8. Financial Operating Results
(dollars in thousands)

2. Aircraft

Operations are dependent on the company's lift capability performance. There were 90 aircraft that were key to the company's in-service fleet performance as recorded at the end of FY 93. This in-service fleet consists of 90 aircraft including: 26 DC-8s (consists of 10 series 61, 6 series 62 and 10 series 63), 53 DC-9s (consists of 2 series 10, 37 series 30, and 14 series 40), and 11 YS-11 turboprop aircraft. Twelve of these aircraft are leased (6 DC-8s and 6 DC-9s), the

rest are owned by the ABX. In addition, approximately 50 smaller aircraft are chartered nightly to connect small cities with company aircraft that then operate to and from Wilmington. (Airborne 10K, 1993, p. 4)

3. Other Assets

This company owns its own airport, runways, main sorting center, storage facilities, training center, and operations and administrative offices. This company owns 3,600 of their 9,900 radio-dispatched vans and trucks. Independent contractors provide the balance of pickup and delivery services provided. Airborne also has approximately 7,300 package/letter drop boxes in service. Airborne owns their proprietary freight tracking and computer system, FOCUS. (Airborne 10K, 1993, pp. 2-3)

The company leases general and administrative properties and facilities located in Seattle, Washington. The 232 domestic and 22 foreign stations they operate are mostly leased. (Airborne 10K, 1993, p. 13) Table 9 outlines the working capital and valued assets of the company.

	1993	1992
Working capital	\$ 60,564	\$ 50,276
Property and equipment	733,963	730,937
Total assets	1,006,909	964,739

(Airborne Annual Report, 1993, p. 16)

**Table 9. Financial Structure for FY 93 and 92
(dollars in thousands)**

IV. BURLINGTON AIR EXPRESS

This chapter discusses Burlington Air Express' business of operations, services provided, pricing, and financial structure. Review of these areas is necessary for understanding the makeup of a major commercial air freight carrier.

A. BUSINESS OVERVIEW

Burlington Air Express (BAX) is a subsidiary of the Pittston Company, which consists of two business groups for the company's reporting purposes. The business groups are the Pittston Services Group and the Pittston Minerals Group. The Pittston Services Group consists of air freight and logistics management services, armored car and home security businesses (BAX, Brinks Armored Car, and Brinks Home Security Services).

Burlington Air Express, Inc., is a global air cargo express company based in Irvine, California that specializes in transportation and logistics management services for industrial shippers worldwide (Burlington CP, 1994). It is primarily engaged in North American air freight and international air and sea freight forwarding, logistics management services and customs brokerage (Pittston 10K, 1993, p. 1). The activities related to the Burlington segment for the Pittston company are carried on by Burlington Air Express Inc. and its subsidiaries and certain affiliates and associated companies in foreign countries.

Burlington Air Express has been in the transportation business for over 22 years and has been in operation since 1972, internationally since 1973. They specialize in worldwide movement of cargo (no size or weight restrictions) and serve customers in automotive, health care, electronics, fashion, and aerospace industries. BAX serves a majority of the Fortune 500 companies, tailoring their transportation

services to accommodate the industrial customer's business-to-business needs. (Burlington CP, 1994)

Burlington competes with other integrated air freight companies that operate their own aircraft, as well as freight forwarders, express delivery services, passenger airlines and other transportation companies. They employ approximately 5,500 employees worldwide; 1,300 of these employees are classified part-time and 200 of them are represented by labor unions. (Pittston 10K, 1993, p. 4)

B. OPERATIONS

Burlington is one of the largest air freight companies in the world serving over 100,000 destinations in North America and every country in the world through their freight forwarding network. BAX operates a fleet of 24 leased aircraft to provide regularly scheduled services in the U.S. and certain destinations in Canada. This fleet is also utilized for charters and international markets at certain times. (Pittston 10K, 1993, p. 2)

The nightly lift capacity averaged by this fleet of aircraft in FY 93 was about 1.6 million pounds calculated on an average density of 7.5 pounds per cubic foot. The combination of Burlington's trucking capability allows for a total nightly cargo capacity through their hub in Toledo to be 3.3 million pounds. (Pittston 10K, 1993, pp. 2-3) This increase in lift capability has increased Burlington's total weight shipped worldwide by 14 percent (1992: 893 million, 1993: 1,020.4 million). (Pittston Annual Report, 1993, p. 37)

Burlington utilizes a proprietary, satellite-linked, global communications and information system called Argus+®. This system provides continuous tracking of shipments and various data for management information purposes to improve efficiency and control costs. Burlington has begun to develop

a tracking system that will utilize bar code technology and hand-held scanners. (Pittston 10K, 1993, p. 2)

C. SERVICES

1. Scope

BAX offers a scope of airfreight and logistics management services worldwide. They will ship letters, packages, and cargo of any size or weight. Their services do not specify variations of service levels if shipments are over 150 pounds. This company's air fleet is dedicated for domestic and Canadian air freight services while they offer air and sea freight forwarding services internationally. They also provide an array of special services that cater to industrial needs. BAX, like most other carriers, will not ship certain hazardous materials, corpses, most live animals including reptiles, fish, birds and insects, items prohibited by law, as well as precious metals, money, personal items or collectibles valued over \$500 per shipment (Burlington WSG, 1994, pp. 89-90, p. 325). Burlington Air Express participates in the Civil Reserve Air Fleet (CRAF) program for cargo shipments. (CRAF, 1994)

2. Domestic

Burlington serves all major business communities including thousands of smaller cities across the U.S. They provide several domestic services including overnight, door-to-door, or second day delivery of virtually any size or weight package to all 50 states. (Burlington WSG, 1994, pp. 6-7)

a. Overnight Service

This service provides door-to-door delivery of virtually any size or weight shipment by noon for "A" points

and by 5 pm for "P" points.¹⁰ "S" is a two day delivery point.

b. Second Day Service

This service guarantees delivery by 5 pm the second business day at a lower cost than overnight service and includes door-to-door delivery of virtually any size or weight package.

c. Next Flight Out Service

This service provides same-day shipping in most cases, depending on flight schedules and airline size and weight limitations. Next flight out services are coordinated by the Burlington network, accessing thousands of commercial flights available each day.

3. International

These services provide scheduled delivery to 160 countries through 4500 flights per month. Through their international freight shipping network, Burlington can arrange forwarding services of shipments to areas that they do not regularly service. (Burlington WSG, 1994, pp. 4-5 and International service enclosures)

a. Time-Definite PremiereSM

This service provides the fastest delivery possible, door-to-door, to major business centers. It also provides customs-cleared service for virtually any size or weight shipment.

b. International Express

A service that provides door-to-door delivery of virtually any size or weight shipment to almost anywhere in the world. Using their own USA network, BAX routes shipments

¹⁰These points define origin and destination areas that allow the customer to estimate the company's servicing times for pickup and delivery. (Burlington WSG, 1994)

to the nearest international airport serving the final destination.

c. Standard Airfreight

This service allows for delivery of virtually any size or weight shipments. Freight is consolidated with other shipments with the same destination, then the consolidated shipment is transported by the fastest route possible. This service allows for cost savings over direct airline rates.

d. Burlington Ocean ServicesSM

This service provides cost effective transportation and documentation services for importing and exporting of cargo. Burlington provides door-to-door, door-to-port, port-to-port, or port-to-door services. They ship less-than-container-loads (LCL) and full-container-loads (FCL).

e. IATA Services

International Air Transportation Association (IATA) direct airline services allow Burlington to provide service to those hard to reach destinations that consolidations do not service and accommodates shipments with special delivery requirements.

4. Special

Burlington provides a variety of special services internationally as well as domestically. Saturday pickup and delivery, hold for pickup and collect on delivery services (C.O.D.) are available. (Burlington WSG, 1994, pp. 10-14) The following types of special services are provided:

a. Burlington DirectSM

This service offers direct, expedited charter service between the U.S., Tokyo and Hong Kong for virtually any size or weight shipment. No split shipments are allowed.

No off-loading is performed at congested international airports.

b. Worldwide Customs Brokerage/Imports Services

This service allows for control and dependability on all import transactions so that these transactions are

simplified. The service is available at all major airports and BAX ocean port offices. BAX furnishes customs clearance and all required documentation, banking services, and insurance coverages.

c. Charters

BAX provides charter services from pick up to delivery and will assist in selection of the appropriate aircraft for efficient shipment to anywhere worldwide.

d. Sea/Air ExpressSM

BAX offers expedited services from the northern provinces of China to virtually anywhere in Europe, the USA and Canada. Shipments are delivered in as little as four days. There are no size or weight restrictions.

e. Euro-BAXSM

BAX provides door-to-door delivery to virtually every major city throughout Europe. Most destinations are delivered overnight and expedited delivery of any size/weight shipment is offered.

f. Hazardous Goods Handling

BAX has over 600 trained employees to handle hazardous goods. This service avoids unnecessary shipment separations that may occur due to special handling requirements of different hazardous materials. Shipments are handled in accordance with IATA "Dangerous Goods" regulations. BAX does not ship hazardous waste material, class A, or class B explosives.

g. Fashion Services

BAX provides services to the fashion industry for specialized delivery of clothing.

h. Security Courier Service through Brink's Air Courier

This service provides secure delivery of those items (e.g., jewelry, bank notes, precious metals) that are fully-insured and require constant monitoring and control from pick up to delivery.

i. Convention & Trade Show Services

This is a special service provided for quick movement of exhibit materials from the customer's door to the convention floor and return.

j. Government Services (USA)

BAX provides support for military and non DOD shipments to anywhere in their worldwide network. BAX provides specialists in required DOD shipping regulations.

k. Burlington Global Logistics ServicesSM

Burlington has strategically placed their logistics centers to better serve companies that operate locally, regionally, or internationally. Facilities are located throughout Europe, and a dedicated logistics center is located in London and in Singapore. The Toledo hub provides these services domestically and a logistics facility is under construction there.

5. Canadian

Burlington provides service to Canada from almost anywhere in Canada. Much of these services duplicate those that are provided domestically. (Burlington WSG, 1994, pp. 8-9)

a. Domestic Canada

BAX provides overnight, door-to-door service to all major areas in Canada accommodating any size or weight package.

b. U.S.A. To Canada Transborder

BAX provides door-to-door service for virtually any size or weight shipment. Major Canadian centers are serviced overnight from virtually any USA origin.

c. Low Value Shipment Clearance (LVS)

This program expedites shipments valued at US\$1000/CAN\$1,200 or less, and can be expedited through customs for next day delivery.

d. Canada to U.S.A. Transborder

BAX provides overnight service to major USA destinations with extended service to other areas, accommodating virtually any size, weight or type of cargo.

e. International Services

These services include: Next Flight Out for time sensitive goods; Consolidation Service for cost sensitive goods; Standard Airfreight for service-sensitive goods that require special handling (e.g., perishable, hazardous goods). Charter services are also available.

D. PRICING

Burlington Air Express uses total weight pricing methods for billing purposes. They consolidate charges based on the total weight of all the pieces in a shipment to one destination rather than bill the customer separately for each piece. Volume discounts are offered to high volume customers who move large quantities of goods on a regular basis.

Dimensional weight pricing is also applied to those shipments with overall measurements exceeding 166 cubic inches per pound for both U.S. and international shipments. The chargeable weight is the greater of the actual or dimensional weight charges. Additional charges apply to pieces in a shipment that are oversized.¹¹ Burlington may assess a premium of 30 percent of the total transportation charge in addition to other charges if shipment pieces are oversized, provided they fit into a 121 inches by 88 inches pallet position. Special arrangements are required for shipments containing pieces measuring in excess of 121 inches in length, or 84 inches in width, or 74 inches in height. All shipments are subject to the physical constraints of the aircraft configuration and flight safety limitations. Additional service charges apply for special handling and requirements (dangerous goods,

¹¹Burlington defines oversized pieces as shipments which have any dimension (length, width or height) in excess of 73" (maximum height 74").

Saturday or holiday pickup, and declared value charges).
(Burlington WSG, 1994, pp. 86-90, pp. 320-326)

E. FINANCE

1. Revenues

Burlington Air Express international operations (export shipments from the U.S.) accounted for 54 percent of the revenues they made in FY 93. Their operating income more than doubled and their operational expenses increased by \$76.2 million, resulting from increased volume of business and upgraded fleet assets (i.e., DC8-71 replaced B707 aircraft). Their general administration expenses decreased by \$.5 million due to downsizing efforts. (Pittston 10K, 1993, p. 49) Table 10 outlines Burlington's financial results in FY 93 and 92.

	1993	1992
Total revenues	\$998,079	\$900,347
Domestic	462,000	421,600
International (includes U.S. and Canadian imports and exports)	536,079	478,747
Operating profit	37,971	15,118
Capital expenditure	21,544	14,412
Depreciation, depletion and amortization	15,250	14,379
Assets	\$418,694	\$407,335

(Pittston 10K, 1993, p. 98)

Table 10. Financial Results for FY 93 and 92
(dollars in thousands)

2. Assets

Since 1993, Burlington has utilized a fleet of 24 leased aircraft that include seven DC8s (DC8-63F), nine DC8-71s, two

B727s, and six additional cargo aircraft.¹² Burlington owns or leases approximately 410 automobiles as well as 164 vans and trucks in U.S and Canada. (Pittston 10K, 1993, pp. 2-3, p. 6)

Other properties and facilities include 212 (118 domestic and 94 international) operating stations with additional agency agreements at an additional 271 (67 domestic and 204 international) stations. The majority of Burlington's operating stations are held under lease. Office space and warehousing are maintained in 47 states and Puerto Rico. Their Toledo hub as well as their corporate headquarters in Irvine are leased. (Pittston 10K, 1993, p. 6)

¹²The DC8's have a maximum payload of 100,000 pounds with a main deck cargo volume of 8,100 cubic feet. The Boeing 727 aircraft have a maximum payload of 45,000 pounds with a main deck cargo volume of 4,050 cubic feet. (Burlington WSG, 1994, pp. 36-37)

V. EMERY WORLDWIDE EXPRESS

This chapter discusses the scope of Emery Worldwide's business operations, services, pricing, and financial structure. Review of these areas provide an understanding of the composition of a major commercial heavy air freight industry and how it operates.

A. BUSINESS OVERVIEW

Emery is a \$1.3 billion air freight subsidiary of Consolidated Freightways (CF), Inc. Emery provides time-definite air freight with 289 service areas in North America. They also provide services to 180 countries. This company focuses on providing commercial air freight for businesses and industries who need time-definite service for parcel, package and heavy freight shipments over five pounds. (EWWNR, 1994)

Consolidated Freightways purchased Emery Air Freight in April 1989 and merged it with their own CF AirFreight and called it Emery Worldwide (EWW). The first profitable year was 1993. CF management decided to ship heavier packages and freight (anything weighing 5 pounds or more) rather than compete in the air express market. Since this decision, the company's daily volume decreased but the average weight per shipment increased, resulting in higher revenues. (ATW, 1994, p. 105) Emery and Consolidated Freightways are headquartered in Palo Alto, California. Emery is considered to be a pioneer in the air freight industry and has been operating for 50 years.

Emery considers their main competition to be Federal Express and UPS. The decision not to compete with the overnight envelope business and focus on fewer customers, shipping larger volumes, has resulted in an improvement for Emery's financial position in the market. This company has focused their business on Fortune 500 companies and caters to industrial and commercial cargo markets. Emery has the largest

market share in the heavy airfreight industry in North America with nearly a 20 percent market share. They compete with other integrated air freight carriers as well as freight forwarders. Emery considers its main competitor to be Burlington Air Express in heavy freight. (Knight-Ridder, 1993). In the total U.S domestic market share for packages weighing over 70 pounds, Emery ranked second only to Federal Express. (Distribution, 1994, p. 22) Emery has approximately 7,500 full and permanent part-time employees. About 15 percent of these employees are covered by union contracts. (CF 10K, 1993, p. 10)

B. OPERATIONS

In 1992, Emery's average weight per shipment was 154 pounds for domestic and 242 pounds for international shipments. (SF Business Times, 1993, p. 1) This average weight per shipment is three to five times greater than it was in 1990. Currently, Emery's average domestic shipment is between 170 to 180 pounds and over 300 pounds for international shipments. (Emery, 1994)

Emery Worldwide's aircraft fleet is provided by their airline affiliate Emery Worldwide Airlines (EWA). The airline hub for this fleet of 71 aircraft is located at Dayton, Ohio. These aircraft are dedicated to Emery's overnight, charter, and other services. Emery handled a total of 6.7 million shipments weighing 1.0 billion pounds for fiscal year 1993. (CF Annual Report, 1993, p. 21)

Emery Worldwide has a global management information and communication network called EMCOM that provides computer and telecommunication support for shipment tracking and customer information request. GEMINI is a PC-based software program that has a direct uplink to EMCOM, allowing customers to prepare shipping documents, labels and reports. This program is provided to Emery's frequent shippers so they can generate preprinted airbills and shipping labels, as well as allow them

to obtain on-site rating, invoicing and shipment status report information.

C. SERVICES

1. Scope

Emery provides global air cargo services through an integrated freight system for the movement of parcels and packages of all sizes and weights. Emery provides global logistics services as well. North America is serviced through a system of branch offices and is represented overseas through foreign subsidiaries, branches and agents. They provide door-to-door service within North America by using EWA airlift system supplemented with commercial airlines. They provide international services by operating as an air freight forwarder, using commercial airlines, and with controlled lift assets when necessary. They also provide customs brokerage and ocean forwarding services. (EWWNR, 1994) Emery also participates in AMC's CRAF program for air cargo. (CRAF, 1994)

2. Domestic

This section will address domestic freight services provided by Emery. These services are also provided to and from Canada. (EWWNR, 1994 and ECSG, 1992, pp. 4-5)

a. Same Day

This service is provided for shipments requiring immediate delivery. Same day service is available 24 hours a day, 365 days a year.

b. Next Day

Emery provides door-to-door transportation for shipments that require delivery for the next business day. Delivery by noon or by 5 pm (more economical) can be specified.

c. Second Day

This is Emery's economy door-to-door service, delivering by 5 pm the second business day.

3. International

This section addresses the specific international services provided by Emery. (EWWNR, 1994 and ECSG, 1992, pp. 6-7)

a. Express

This service provides door-to-door pick-up and delivery via Emery's aircraft in its controlled network. The service includes customs clearance and international document processing.

b. Preferred

This service provides airport-to-airport pick up and delivery using the fastest direct service daily. The service includes processing of shipment and international documents at origin and destination airports and notification of consignee or customs broker.

c. Standard Plus

This service provides door-to-door pick up and delivery, with air transit via scheduled airlines. The service includes document assistance and notification of consignee or customs broker.

d. Standard

This service provides for consolidated airport-to-airport delivery through use of scheduled airlines. The service includes document assistance and notification of consignee or customs broker.

4. Special

This section addresses special cargo services and service options available. (EWWNR, 1994, and ECSG, 1992, pp. 8-9)

a. Emery Customs Brokers

This is a full-service, custom brokerage agency that allows Emery to provide expert assistance with international shipment documentation, customs service and clearance for import or export shipments.

b. Logistics Worldwide

This service allows Emery to provide multi-modal logistics services to customers. It allows for the management of customer product and supply needs, and links them domestically as well as internationally for customer distribution, production, and sourcing needs. It also provides international logistics management for overseas-to-overseas locations.

c. Quick Source Depot Program

Emery provides an integrated contract logistics management, inventory handling and distribution program. The Quick Source Depot Program is primarily used for high-value or time-sensitive products or components.

d. Charter Services

Emery arranges dedicated aircraft charters to meet time-critical or product sensitive customer needs in North America and in every major continent.

e. Transportation Protective Services

This service allows for constant surveillance security of a shipment, signature security service and controlled processing for HAZMAT¹³ shipments of dangerous and perishable goods as well as live animals.

f. Customer Service Center

Emery provides a 24 hour telecommunication based service information center. It allows customers to inquire about shipment status, schedules, pricing, and service availability.

D. PRICING

Emery Worldwide Express pricing is based on the total weight of a shipment to one destination. Since Emery's business is tailored toward the business-to-business traffic shipper, rates are negotiated on a customer basis. Emery will

¹³Hazardous materials are shipped within IATA standards.

then design a tariff rate system specific to that customer's business needs. Emery will ship letters, packages, and freight weighing less than five pounds per piece; however, their single shipment rating structure is not competitive with other letter and package express industry leaders and may tend to be higher. Letters and small packages will not benefit from Emery's more economical rate scale. (Emery, 1994)

Emery also utilizes dimensional weight pricing techniques for oversize lightweight shipments (measurements exceeding 166 cubic inches). The greater of the actual weight or the cubic dimensional weight determines the chargeable weight rate. Charges for shipments containing oversized and unusual pieces are applied to domestic and Canadian shipments which have any dimension of 85 inches or greater. These shipments are assessed a premium of 30 percent of the total transportation charge in addition to all other charges. A charge equal to 20 percent of the transportation cost is applied if any piece of a shipment exceeds a length plus girth of 150 inches. Rates that are scheduled for Preferred, Standard, Standard-Plus and Express international services may not apply to international shipments containing pieces measuring in excess of 125 inches in length, 84 inches in width, and 62 inches in height. These dimensions apply to international oversize shipments and rates must be negotiated with an Emery representative. (ECSG, 1992, pp. 10-11)

Special handling fees may be assessed if a shipment requires special services including shipments requiring pick up and delivery services, dangerous goods or hazardous material handling, protective transportation for shipments that require constant surveillance or signature security.

E. FINANCE

1. Revenues

The year 1993 was a major financial turning point for Emery Worldwide, because this is the first time this company (since the acquisition by CF) has had an annual profit.

Revenues increased by 10 percent from 1992 due entirely to gains in commercial business. Emery's strategy has been to develop new and expand existing business while emphasizing cost containment measures through downsizing and rightsizing techniques. (CF Annual Report, 1993, p. 25)

In 1993, Emery was awarded a ten year contract by the U.S. Postal Service (USPS) to carry Express and Priority mail starting January 1994. Contracts with USPS have recognized approximately \$138 million and \$141 million of revenue in 1993 and 1992 respectively. (CF 10K, 1993, p. 8) Table 11 outlines Emery's financial results from FY 93 and 92. The first two quarters of 1994 results are added to show that the progress they have made in 1993 has more than doubled in 1994.

	1993	1992	JAN 94- JUN 30, 1994
Revenues	\$1,261,273	1,147,204	730,179
Operating income	16,591	(32,651)	34,014
Operating expenses	1,022,263	970,402	446,648
Selling and administrative expenses	200,473	186,731	N/A
Depreciation	21,946	22,722	N/A
Capital expenditure	82,128	20,096	N/A
Identifiable assets	907,755	869,082	N/A

(CF Annual Report, 1993, pp. 46-47) and (CF 10-Q, 1994)

**Table 11. Financial Results for FY 1993/1992
and 1ST/2ND Quarter 1994
(dollars in thousands)**

2. Assets

Emery Worldwide utilizes a fleet of 50 aircraft of which 28 are leased on a long-term basis, 13 contracted on a short-term basis, and 9 are owned by the company. Nightly lift capacity of this aircraft fleet, excluding charters, is approximately 3.3 million pounds. Emery Worldwide Airline provides nightly cargo airline services under a contract with the U.S. Postal Service (USPS) to carry Express and Priority mail with an additional 21 aircraft (6 leased, 15 owned). Emery also operates approximately 1,590 trucks, vans and tractors. (CF 10K, 1993, pp. 7-8)

Emery Worldwide leases a majority of their facilities and properties. Of the 235 terminals and freight service centers they operate around the world, they lease 229 and own 9 of them. They lease facilities in Dayton, Ohio, Los Angeles, California, and Indianapolis, Indiana. Besides their principal sorting hub in Dayton, Emery has international sorting hubs in Brussels, Belgium and in Manchester, England. There are international gateways located in 11 U.S. cities. (CF 10K, 1993, pp. 11-12, and EWWNR, 1994)

VI. PRIVATE AIR FREIGHT COMPANIES

This chapter discusses two privately owned companies' scope of business, operations, and services, as well as available financial background. Information is limited due to their private status; however, review of these companies and their business structures is necessary to understand the composition of major, successful commercial air express companies.

A. DHL WORLDWIDE EXPRESS

1. Business Overview

DHL provides express delivery of documents and packages, regardless of size or weight, throughout the U.S. and world. This company began in 1969, by Arian Dalsey, Larry Hillblom and Robert Lynn (D, H, L) with a delivery they made from San Francisco to Hawaii, evolving into the worldwide business they have today. DHL emerged as the first air express service to service the Pacific rim and, in 1978, DHL services were worldwide.

Today, the DHL network is composed of DHL Airways, Inc. which serves all locations within the U.S., and DHL International Ltd., which serves all locations outside the U.S through their agents and affiliated companies. DHL's USA Headquarters is located in Redwood City, California and their Worldwide Headquarters is in Brussels, Belgium. DHL employs a total of 29,000 personnel worldwide to provide the customer service and speed of delivery in which they claim to excel. They operate fourteen hubs and 1,630 offices worldwide and are dedicated to the fastest and most reliable service possible. (DHL TWSH, 1993)

Shipping rates are based on total weight of the shipment to one location. Dimensional pricing techniques apply for lightweight, oversized packages. Volume discounts are negotiated between DHL and its customers. (DHL CSR, 1995)

2. Operations

DHL is considered to be one of the world's largest air express companies with a network extending to more countries than any other competitor in the market. The primary focus is to provide international air express service. DHL operations service over 80,000 destinations, in 221 countries. In 1993, they processed 71 million shipments. (DHL TWSH, 1993)

A shipment is handled by DHL's single-source shipping from origin to destination. DHL is not a freight forwarder, and maintains control of all cargo throughout shipment. They also provide logistics and management reporting services to anticipate their customer's needs.

DHL's tracking and tracing service is performed through an electronic tracking system called LaserNet. DHL couriers carry hand-held scanners that allow up-to-date shipment information to be forwarded into the company's central computer system. This allows customer service representatives to update a customer regarding their shipment status. (DHL QRG, 1994, p. 3)

3. Scope of Services

DHL will deliver letters, packages and cargo for any size, weight, value, or commodity shipped. Discounts are available if the customer drops off their shipment to one of DHL's express shipment centers or drop boxes. DHL will also verify proof of delivery, verbally, at no extra charge. An additional charge will apply if the customer requires written confirmation. Insurance coverage of shipments is available up to \$25,000 for an additional fee. Additional coverage is available through prior arrangements. (DHL TWSH, 1993). DHL is a participant in the CRAF program for air cargo shipments. (CRAF, 1994)

4. Domestic Service

DHL offers only one domestic service called *USA Overnight*. Overnight delivery of documents and packages is

guaranteed to all major business centers, with most shipments delivered by 10:30 am, depending on location. (DHL QRG, 1994)

5. International Services

International express service delivery transit times may be lengthened for shipment pieces weighing over 110 pounds or over 48 inches in size of any one dimension. Pieces over 550 pounds are shipped express, with special approval by the company. These pieces are considered freight and are eligible for freight servicing. (DHL, 1995) This section addresses the specific international services DHL provides. (DHL TWSH, 1993)

a. DHL Worldwide Priority Express™

This service is DHL's fastest, most reliable means to export and import customer dutiable goods of any size, weight or value, door-to-door, virtually anywhere in the world. There is no minimum weight requirement for this service. DHL will quote one, all-inclusive price (excluding duty and certain country taxes) to pick up and deliver to the destination.

b. International Document Service

DHL provides overnight document delivery service to more worldwide destinations than any other express network. Special rates are available for documents up to 30 letter-size pages.

c. International Airfreight

This service provides delivery of any size shipments, utilizing a hand-picked group of airlines in conjunction with DHL's established freight delivery network to meet customer service needs. Several air freight service options are available:

- **Door-to-Door.** DHL provides a premium service for their fastest possible transit time for dutiable shipments.

- **Preferred Air.** DHL provides door-to-airport or airport-to-airport service within two to three days. These shipments are moved via commercial airlines within 24 hours of receipt.
- **Standard Air.** Shipments are assured three to four day delivery at an affordable price through DHL's regularly scheduled consolidations.
- **IATA.** DHL provides direct servicing by acting as the agent for the customer and for the airline.

6. **Special Services**

This section addresses the special freight services and options available through DHL. (DHL TWSH, 1993)

a. **WorldMail®**

This service will deliver international mail at a significant cost savings over other delivery services. DHL offers various mail services to meet customer requirements.

b. **"Same Day" Service**

DHL offers expedited, same-day service for critical international and domestic shipment needs. Shipments are processed on a next flight out basis using their own aircraft fleet and scheduled airlines. Services are available 24 hours a day, 365 days a year.

Several same-day service options can be requested for shipment:

- **Hand Carry.** DHL provides courier service, door-to-door.
- **Express Freight.** DHL provides domestic delivery in 12-24 hours; international destinations may vary, but usually within 48 hours.
- **Hold for Pick up.** After the shipment is airborne, the receiver is notified for pick up at the destination airport.
- **Delivery Only.** The customer delivers to the origin airport and DHL completes the delivery to destination.
- **Charter.** This service is provided when the customer requires an entire aircraft.

- **Local Drive.** The shipment is driven to the destination without being consolidated with other deliveries.

c. FaxlynxTM

An international facsimile service is available which offers hand delivery to the destination up to two days faster than conventional air express.

d. Visa-PakTM

This service will pick up the customer's passport and applications, deliver them to proper authorities, and return the completed documentation.

e. 24-Hour Customer Service

DHL offers this service for courier pickup, proof of delivery, shipment tracking, transit times or any assistance and information, anytime.

f. Export Documentation Service

This service is available to customers requiring assistance with paperwork that must accompany international dutiable shipments. Additional charges apply.

g. Collect Billing

This service allows the customer to send an international or domestic shipment and have a third party pay for the transportation charges. Collect Billing is not available to all the countries DHL serves.

h. Saturday, Sunday and Holiday Service

DHL offers weekend and holiday express service. Customers request weekend service by Friday to ensure Saturday pick up, Saturday delivery to other destinations, as well as Sunday or holiday service.

7. Financial Structure

DHL does not publicize its profit figures; it is a privately held company. The company does report its system-wide revenue trend which has increased approximately 13 percent to 14 percent per year. In 1992, DHL reported its revenues at \$2.8 billion. (ATW, 1994, p. 101) In 1993 their

total revenues were published at approximately \$3.0 billion with approximately \$670 million of that total from domestic shipments.

DHL operates a fleet of 150 aircraft to ensure delivery of shipments around the world. They operate 14 hubs (4 in the U.S, 10 internationally); their main hub is located in Cincinnati, Ohio. DHL also operates 1,630 offices (1,358 of these are located internationally). (DHL TWSH, 1993)

B. UNITED PARCEL SERVICE (UPS)

1. Business Overview

UPS provides transportation services worldwide, primarily through the delivery of small packages. Service is offered to every address in the U.S., Western Europe and to many addresses in Canada. UPS also provides service to locations in the Soviet Union, certain countries in Eastern Europe, Asia (including People's Republic of China), the Middle East, Africa, and Central and South America (including the Caribbean). (Moody's, UPS, 1994) UPS was founded in 1907 and incorporated in Delaware in 1953. UPS is a private company, headquartered in Atlanta, Georgia that employs 303,000 personnel worldwide.

UPS rates are based on a price per package weight; however, Hundredweight Pricing¹⁴ is available for ground and air shipments over 200 pounds (150 pound limit per package). UPS also offers "Weight Break Pricing" discounts for shipments weighing more than 500 pounds.¹⁵ (UPS RTS, 1993, p. 6) Prices for oversized and light weight air freight packages are based on dimension rather than weight. The dimensional

¹⁴Hundredweight ground and air services offers reduced rates for those shipments that total 200 pounds or more to a single receiver at one location on a single day.

¹⁵This pricing is based on the same conditions as Hundredweight pricing; however, it offers a better discount rate for those shipments over 500 pounds.

formula, or "dim weight,"¹⁶ is determined by multiplying a package's length by its height and by width, and then dividing the total by 194. The same method is used for international dim weight calculation, except the total is divided by 166.

2. Operations

UPS operations are worldwide with service to over 200 countries and territories as well as to every address in the U.S. UPS is also the largest package distribution company in the world. (PR Newswire, 1994) For 1993, their total delivery volume was 2.94 billion parcels and documents, averaging a daily delivery volume of 11.5 million parcels. Their daily air delivery volume alone was 1.1 million parcels and documents (UPS Next Day Air and 2nd Day Air combined) utilizing 458 aircraft.

UPS TotalTrack is the company's electronic tracking system which allows for immediate package tracking for bar-coded packages. (UPS PR/KDH, 1994)

3. Scope of Services

UPS provides domestic, North American and international services. UPS moves a limited selection of hazardous material for the domestic market only. UPS's maximum weight is 150 pounds (70 pounds for hazardous materials) per package and they do not accept packages that exceed 130 inches in length and girth combined. Maximum length is 108 inches for any package. The maximum declared value for a single package is \$50,000. (UPS Rate Chart, 1994) UPS is a participant in the CRAF program for air cargo shipments. (CRAF, 1994)

4. Domestic Services

This section addresses the specific services UPS provides domestically. (UPS Rate Chart, 1994 and UPS RTS, 1993)

¹⁶Dim weight pricing is used when the dimensional price exceeds the actual weight price. (Distribution, April 1994) Rates based on dimension are used when a package is over a total of 84 inches length and girth combined. (UPS CSA, 1994)

a. UPS Ground Service

UPS offers an array of ground delivery services for the most economical rate. Ground shipments are delivered by truck, e.g., UPS Hundredweight ServiceSM and UPS Ground SaverSM. Delivery is usually more than 3 days, depending on destination.

b. UPS Next Day Air Saver[®]

UPS provides overnight service for next day delivery in the afternoon, either by 3 pm or 4:30 pm depending on location.

c. UPS 2nd Day Air Service[®]

UPS provides two day delivery service for those packages that are time sensitive but not required on the next day.

d. UPS 3 Day SelectSM

UPS provides guaranteed, trackable three-day service. This service integrates UPS air and ground services for deliveries that are not time sensitive.

5. UPS North America Service

Three services are provided to locations between the U.S., Mexico and Canada. *Express* service guarantees delivery in one business day throughout North America. For less time sensitive deliveries, UPS offers *Expedited* service which guarantees delivery within three business days. *Standard* service provides transborder ground delivery for cargo that is not time sensitive. (UPS CMSG, 1993)

6. International Services

This section addresses UPS' international services available to their customers. (UPS IASG, 1992 and UPS RTS, 1993, pp. 14-19 and UPS ASRZC, 1994)

a. Worldwide Express

UPS offers delivery of urgent packages and documents to over 180 countries and territories. Most UPS Worldwide Express shipments are delivered in two business days.

b. *Worldwide Expedited*

UPS provides scheduled delivery of air freight packages to major trading countries in Europe and Asia. Most of these shipments are delivered in four business days.

c. *UPS EuroExpress*

EuroExpress service provides next day delivery before noon between major metropolitan areas throughout Europe.

d. *UPS EuroExpedited*

UPS provides ground delivery throughout Europe via roadways to deliver packages and freight to 15 countries.

7. *Special Services*

This section addresses special services and service options provided by UPS. (UPS RTS, 1993, pp. 6-7 and UPS ASG, 1993, pp. 2-4)

a. *UPS Hundredweight ServiceSM*

UPS Hundredweight ground and air services offer reduced rates for shipments that total 200 pounds or more (150 pound weight limit per package is still required). This service delivers to all addresses in the contiguous 48 states and to 10 Provinces in Canada. Service is restricted to a single consignee at one location on a single day.

b. *UPS Ground SaverSM*

UPS provides a contract service that offers rate incentives and specialized ground transport services for qualifying business-to-business shipments.

c. *UPS GroundTrac[®]*

This service allows all customers to have their ground packages traced by UPS for a 75 cent service charge.

d. *UPS Prepaid Letter Service*

This service enables customers to buy UPS Next Day Air or 2nd Day Air Letters in advance.

e. *UPS Saturday Delivery and Pickup*

Saturday delivery and pickup services are available.

f. UPS Worldwide Logistics, Inc.

This UPS subsidiary provides consulting and contract logistics services to customer firms with distribution needs.

g. Hazardous Materials Service

UPS offers an air express service for certain items classified as hazardous material (e.g., dry ice, perfumes, cosmetics, and other materials regulated by the FAA).

8. Financial Structure

UPS is a privately held company and detailed financial information is not publicized. In 1993, UPS volume and revenues grew beyond the company's expectations while domestic ground operations lost market share. UPS total revenues and expenses are the largest of the air transportation companies. (UPS RTS, 1993, p. 4) Table 12 reviews UPS' published financial structure.

	1993	1992
Revenues: 89% domestic 11% foreign	\$17,782,353	\$16,518,621
Total costs and expenses	\$15,633,284	\$14,578,806
Income tax	\$ 622,062	\$ 504,223
Net income	\$ 809,635	\$ 765,072
Operating profit margin	8.2%	7.7%
Total assets	\$ 9,573,831	\$ 9,037,817

(Moody's, UPS, 1994)

**Table 12. UPS' Financial Structure
(dollars in thousands)**

In 1994, UPS utilized 524 aircraft in their operations. These aircraft are owned and leased by the company. As of 1994, the company's aircraft fleet consists of 47 B757 PFs, 18

additional B757 PFs on order (firm deliveries 1995-1997), 58 B727s, 52 DC-8s, 30 B767s on order (firm deliveries 1995-2002), and 15 B747. They also have 302 chartered aircraft. Their ground fleet consists of 119,500 vehicles (package cars, vans, tractors, trailers). UPS also has approximately 2,389 operating facilities and service centers as well as 11 air hub operations. (UPS FACTS, 1994)

VII. AIR MOBILITY COMMAND

This chapter discusses the U.S. Air Force's Air Mobility Command (AMC) roles and missions, scope of operations, services provided, cargo channel rate tariffs, and airlift operational structure. Review of this command will provide a view of the Air Force's cargo operations, similar to that provided previously for commercial carriers. This chapter will focus on AMC's channel flight operations.¹⁷

A. GENERAL

1. Background

The Air Mobility Command was created on June 1, 1992 through the reorganization and merger of the Military Airlift Command and the Strategic Air Command. This command was reorganized from three numbered air forces (two for airlift and one for air refueling) into two air mobility numbered air forces, Fifteenth and Twenty-First, which contain airlift and air refueling units in both. (AMC History, 1994) AMC is a component command under the United States Transportation Command (USTRANSCOM), and its role is to provide strategic air mobility asset management, supporting the DOD transportation system. AMC's service role is to provide operationally-ready mobility forces for unified commands and to augment theater Air Force component command staffs with required air mobility expertise. (AMC FP, 1994)

The headquarters for AMC is located at Scott Air Force Base, in Illinois. AMC is currently authorized 121,938 military and civilian personnel. (AMC STATS, 1994)

2. Operations

AMC's mission areas are airlift and air refueling. The airlift mission area is divided into three operational objectives (i.e., power projection, force sustainment, and

¹⁷Channel flights are regular AMC scheduled flights that have a predetermined APOE and APOD.

humanitarian/peacekeeping) and these objectives are further subdivided into operational tasks. The five operational tasks for the airlift mission include: airlift of cargo, airdrop of combat equipment and personnel, passenger airlift, aeromedical evacuation, and special operations support. Strategic and theater airlift operations for cargo provide the processing, loading and airland movement of bulk,¹⁸ oversize,¹⁹ outsize²⁰ and special²¹ cargo. (AMMP, 1995, pp. 1-4, 1-5)

AMC aircraft, including aircraft in the Civil Reserve Air Fleet (CRAF)²² program, have the capability to transport varying capacities of cargo. Special Air Missions (SAM)²³ are considered part of AMC's passenger airlift capability. The majority of CRAF aircraft are utilized for passenger airlift. CRAF provides 90 percent of passenger and 30 percent of cargo capacity during large military operations. (AMC FP, 1995) Additionally, AMC's Operational Support Airlift (OSA)

¹⁸Bulk cargo is general cargo that is typically preloaded on pallets and transportable by common cargo aircraft.

¹⁹Oversized cargo, as defined by AMC, is cargo requiring a C-130 or larger aircraft for shipment and is typically larger than one 463L pallet (88 inches x 108 inches). (AMMP, 1995, pp. 1-4)

²⁰Outsize cargo is cargo that is normally transported by a C-5 or C-17 aircraft. (AMMP, 1995, pp. 1-5) UMMIPS defines outsized cargo to have any dimension greater than 72 inches (DOD 4500.32-R, 1987, p. A-11).

²¹Special cargo requires specialized preparation and handling services (e.g., space satellites). (AMMP, 1995, pp. 1-5)

²²The CRAF program is designed to augment the organic fleet of AMC with additional airlift capability provided through contracts with commercial air freight carriers to move passengers, patients, bulk, and some oversized cargo. These aircraft cannot carry outsized cargo. (AMC FP, 1994)

²³SAM provides travel for U.S. Government personnel when commercial transportation is not available or would be compromising to U.S. security interests.

provides routine airlift of passengers throughout the DOD system as well as support for the operational requirement of wartime movement of priority cargo. (AMMP, 1995, pp. 1-5)

AMC's worldwide operations fall under the centralized command of the Tanker Airlift Control Center (TACC). TACC reports directly to AMC and is responsible for tasking, scheduling, executing, and recovering all TACC missions including airlift, air refueling, aeromedical and operational support. TACC provides the necessary aircrews for a mission as well as the support required to complete that mission. TACC's role and support is provided in wartime and peacetime situations. (TACC Backgrounder, 1994)

AMC's main airlift transportation operations are classified as channel air flights or special assignment airlift missions²⁴. These services in the commercial world would be representative of an air freight company's regularly scheduled routes or charter aircraft programs, respectively. AMC channel flights are regularly scheduled flights from a specific origin to destination and are provided on a routine basis for authorized DOD, U.S. Government, and non-U.S. Government officials. AMC's special assignment airlift missions allow authorized personnel to schedule an aircraft for specific airlift transportation needs (e.g., OSD/JCS-directed contingency missions). (AFR 76-11, 1994, p. A2-6)

B. CHANNEL FLIGHT OPERATIONS

Channel traffic allows for the movement of passengers and cargo over established worldwide routes served by either scheduled DOD aircraft under the control of AMC or commercial aircraft under contract to and scheduled by AMC. (DOD 4515.13-R, 1980, p. 2-1) These regularly scheduled flights are

²⁴SAAM is a mission by AMC (other than the 89th Military Airlift Wing) that can be utilized at the request of the Department of the Army, Navy or Air Force only. (DOD 4500.32-R, 1987, p. A-15)

comparable to commercial air freight carrier operations. Many of the commercial carriers provide services to the same origin/destinations that AMC channel flights serve, except commercial carriers will not provide delivery services to Army Post Office (APO) and Fleet Post Office (FPO) addresses.

The data in this section are based on actual AMC channel flight shipments. These data were obtained through AMC's Transportation Reporting And Inquiry System (TRAIS) and the Airlift Service Industrial Fund Integrated Computer System (ASIFICS). These databases contain information concerning AMC worldwide operations. FY 1993 data were available for analysis in the form of total billed tonnage shipped per channel flight segment. (MICRO 376, 1994)

1. Scope

AMC provides channel flight services to over 210 international destinations. These channel flight routes for data purposes were grouped into four categories: Atlantic outbound and inbound flights, Pacific outbound and inbound flights, Atlantic intra-theater flights, and Pacific intra-theater flights. In FY 1993, AMC shipped a total of 242,898.5 tons of cargo and 10,354 tons of mail over these routes. (MICRO 376, 1994). Four of AMC's heaviest cargo carrying routes for FY93 were from Dover Air Force Base (AFB), Delaware to Rhein Main in Germany, from Travis AFB, California to Osan Air Base (AB) in South Korea, from Charleston AFB, South Carolina to Howard AFB in Panama, and from Travis AFB to Hickham AFB in Oahu, Hawaii. See Figure 1.

2. Priority

From the data that were provided by AMC, cargo shipments are divided into groupings by priority number. Priority classifications for air cargo shipments are defined by the Uniform Material Movement and Issue Priority System (UMMIPS). Priority is based on the requirements and urgency specified by the customer for cargo delivery. Transportation priorities

AMOUNT OF CARGO SHIPPED ON CERTAIN FY93 CHANNEL ROUTES

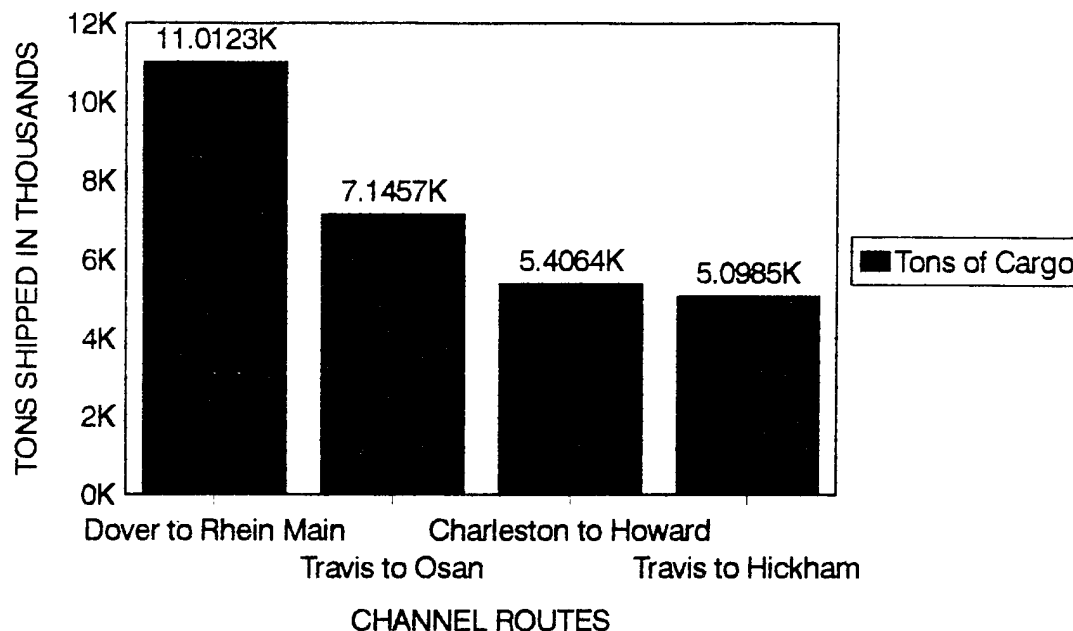


Figure 1. AMC Cargo Volumes

(TPs) are separated into four categories, TP1 - TP4.²⁵ These priority numbers are designated by individual customer requirements. The lower the number the higher the priority for movement.

The priority for actual AMC air missions differs slightly from UMMIPS in the data provided. AMC separates channel traffic cargo movements into four categories: 999 cargo, TP1 cargo, TP4 cargo and other. Cargo that is designated 999 under UMMIPS is TP1 cargo that is flagged to be urgent and

²⁵TP1 and TP2 designated cargo represent air eligible cargo; TP3 and TP4 represent surface eligible cargo.

requires expedited handling. A 999 code appears in the required delivery date (RDD) for a TP-1 shipment (e.g., mission capability cargo). (DOD 4140.1-R, 1993, p. 5-23) This category also represents cargo that has been green-sheeted.²⁶ The TP1 category represents all other TP1 and TP2 air eligible cargo. The TP4 category represents TP3 cargo designated as deferred air freight charged at a surface rate. TP4 cargo is used as filler for those aircraft that have excess space available (e.g., household goods, retrograde cargo). The category "other" represents air-eligible cargo that was not designated a priority code. (McDonald, 1994)

Channel flight shipments were subdivided by tons shipped in each transportation priority category. The FY93 AMC channel flight data revealed the following breakdown: 999 25.2 percent; TP1 30.7 percent; TP4 8.0 percent; and other cargo 36.1 percent. Based on transportation priority, 92 percent of the cargo that is shipped on AMC channel flights is air eligible cargo. Table 13 provides the amount of cargo shipped AMC-wide by transportation priority category.

999	TP1	TP4	OTHER	TOTAL
61,150.0	74,657.7	19,477.4	87,613.1	242,898.5

(MICRO376, 1994, p. 1-J-01)

* addition of data is off by .2 due to computer rounding techniques.

**Table 13. Cargo Traffic Moved FY 93 by
Priority Category
(in short tons)**

²⁶"Greensheeting" is a tool used by individual Services to expedite a shipment ahead of other cargo within that same service sponsorship's cargo. This does not create airlift, it only identifies cargo for expedited movement. (Airlift, 1987)

3. Commodities

AMC channel cargo was categorized by commodity code. These codes are defined and listed by the Military Standard Transportation and Movement Procedures (MILSTAMP). Commodity categories allow cargo with similar characteristics to be grouped for purposes of manifesting, billing, costing, accounting, contractor payment and special handling. (DOD 4500.34-R, 1987, p. A-4) Categorized by air commodity code, the following general types of material were shipped on FY93 AMC channel flights worldwide: (TRAIS, 1994)

- Aircraft equipment and supplies (21.02%)
- Unaccompanied baggage (16.15%)
- Vehicles, machinery, and ship and warehouse equipment and supplies (15.82%)
- Communications equipment and supplies (7.58%)
- Rations and subsistence supplies (7.58%)
- Household goods (5.82)
- Construction materials (5.25%)
- Mail (4.06%)
- Medical Supplies (2.31%)
- Ship's parts (2.27%)
- Personnel services (1.77%)
- Chemical corps items and all other chemicals not covered in other classifications (1.75%)
- Office supplies (1.59%)
- Clothing (1.38%)
- All types of ammunition (1.03%)
- Fuels and lubricants (0.97%)
- Explosives (0.97%)

- Armed Forces Courier Service (ARFCOS) material (0.82%)
- Printed forms, publications, drawings, etc. (0.65%)
- Weapons (0.55%)
- Engineer supplies (0.23%)
- Photographic supplies and equipment (0.20%)
- Intelligence materials (0.13%)
- Plants, plant products, insects, mites, nematodes, mollusks, soil, meat (other than rations), animal products, vectors and cultures of animal and plant diseases (0.06%)
- Human remains (0.05%)

The type of material shipped determines the special handling requirements. Special handling of air cargo is defined by the MILSTAMP. Of the FY 93 total channel cargo tonnage shipped, AMC estimates that approximately .4 percent was outsize material, 11.55 to 15.86 percent was hazardous material, 2.46 percent was considered protected or classified cargo and 73.72 percent of the cargo had no special handling requirements. (TRAIS, LEWIS295.XLS, 1995 and FY93SCHD.XLS, 1995)

C. CHANNEL FLIGHT SERVICES

Channel flight cargo is normally scheduled for movement on a first-in-first-out (FIFO) basis within established movement priorities. AMC will handle any type of cargo required for individual Service mission needs. This includes hazardous material (e.g., explosives) and outsized cargo. Commercial carriers normally will not carry Class A or B explosives; however, they will transport small arms ammunition (Class C explosives) if proper permits and authorization are obtained by the customer.

Channel cargo movement under UMMIPS begins when cargo is checked into the aerial port of embarkation (APOE) system. The aerial port has 48 hours to move an item once received (72 hours for Area IV destinations). Once an item departs the APOE for airlift, AMC has 18 hours for in-transit time to transfer cargo that is destined for North/South America (Area I) or Europe (Area II). AMC has 42 hours of in-transit time for cargo destined to the Pacific theater (Area III), and they have 72 hours for cargo destined to South West Asia and smaller APOs and FPOs (Area IV). Once the cargo reaches the air port of debarkation (APOD), AMC has another 18 hours to process the cargo and then 12 hours to allow the consignee to pick it up. AMC possesses its customers' cargo for a period of 3.5 to 7.5 days. (Airlift, 1987, pp. 21-22)

D. CHANNEL CARGO RATES

Channel mission charges for cargo shipments vary with the customer. AMC's channel rate tariff system is published and separated into three categories: U.S. Government and Department of Defense (DOD) Tariffs²⁷, U.S. Government and Non-DOD Tariffs²⁸, Non-U.S. Government and Foreign Military Sales (FMS) Tariffs²⁹. DOD customer rates are the cheapest rates.

AMC cargo rates are assessed by the weight (in pounds) or size (cubic foot) of a shipment. The chargeable weight is the greater of the actual net weight or volume weight,³⁰ as indicated on the transportation control movement document (TCMD). The rate per pound is dependent on the size of the

²⁷Published IAW AFR 76-11, U.S. Government Rate Tariffs.

²⁸Published IAW OSD Direction.

²⁹Published IAW AFR 76-28, Non-U.S. Government and FMS Tariffs.

³⁰AMC determines their minimum charge for dimensional weight by multiplying the cubic dimensions (in feet) by 10 pounds. (AFR 76-11, 1994, p. A1-11)

shipment. AMC rates per pound are classified into five weight breaks, i.e., shipments weighing 1 to 439 pounds, 440 to 1099 pounds, 1100 to 2199 pounds, 2200 to 3599 pounds, and shipments weighing 3600 pounds or more. All DOD cargo has a minimum line item charge of \$5.00. All charges are rounded to the nearest whole dollar. This does not apply to split shipments or mail.

Channel rates are published in tables that list the specific origin and destination of AMC regularly scheduled airlift routes. For routing services not shown in the published tables but on a channel flight, charges are based on the mileage between points where transportation is to be furnished and then multiplied by an already determined rate. For service from a station not shown to stations listed in published charts, the charge is based on the quoted rate to the point listed on the route nearest to the destination desired plus the amount of the resulting mileage charge. This is determined as before by multiplying the resulting mileage to final destination by the mileage rate and adding that amount to the already quoted rate. (AFR 76-11, 1994, pp. A12-14) Table 14 depicts the DOD channel tariffs obtained from AMC's rate tables for four specified routes.

E. AMC BASIC AIRLIFT OPERATIONS STRUCTURE

AMC's airlift operations are performed through the utilization of 262 active duty aircraft (C-5s, C-17s, and C-141s) and 87 reserve aircraft (C-5s and C-141s). AMC has 12 state-side bases, 5 AMC units at non-AMC bases, 36 Air Reserve Component (ARC) units gained by AMC in mobilization (20 Guard, 16 Reserve), and over 100 bases worldwide (i.e., active, Air National Guard and Air Force Reserve). (AMC Stats, 1994)

AMC's airlift channel routing system facilities are located at 13 different locations worldwide. An additional 18 locations support AMC through terminal service contract operations. (AMMP, 1995, pp. 3-12)

ROUTES	0 - 439 Pounds	440 - 1099 Pounds	1100 - 2199 Pounds	2200 - 3599 Pounds	3600 - Above Pounds
Charleston AFB to Howard AFB	101.6	91.4	81.4	71.0	62.5
Dover AFB to Rhein Main AB	171.1	153.9	137.1	119.6	105.3
Travis AFB to Osan AB	251.2	225.9	201.2	175.6	154.6
Travis to Hickham AFB	104.3	93.8	83.6	72.9	64.2

(AFR 76-11, 1994)

Table 14. DOD Cargo Channel Traffic Rates
for Specified Routes
(Cargo/pounds (Cents per pound))

VIII. AMC CHANNEL AND COMMERCIAL AIR FREIGHT RATE COMPARISON

This chapter examines the cost of cargo shipped over AMC channel routes and comparable commercial air carrier routes. A comparison of freight rates is based on similar route structures, type of freight shipped, and service characteristics specified. An overview of the commercial air freight companies and AMC statistics are outlined in a table format in Appendix B. This table provides a condensed overview of the financial, operational and service structure statistics presented in Chapters II through VII.

A. GENERAL

1. Route Structures

Four of AMC's most heavily shipped routes for cargo/mail traffic moved by channel were selected for this comparison. Similar commercial air freight routes were selected for comparison purposes. Table 15 depicts four AMC channel routes and corresponding commercial air freight shipment routes.

	ROUTE 1	ROUTE 2	ROUTE 3	ROUTE 4
AMC	Charleston AFB, SC to Howard AFB, Panama.	Dover AFB, Delaware to Rhein Main AB, Germany	Travis AFB, CA to Osan AB, South Korea	Travis AFB, CA to Hickham AFB, Oahu, HI
Commercial	Charleston, SC to Panama City, Panama	Dover, DE or Philadelphia, PA to Frankfurt, Germany	Oakland, San Francisco, or San Jose, CA to Seoul, South Korea	Oakland, San Francisco, CA to Honolulu, HI

Table 15. Selected Channel and Cargo Routes

Commercial aircraft service access is limited to commercial airports which are usually located in major cities. The

Commercial routes selected correspond as closely as possible with the AMC channel routes. Howard AFB is less than 20 miles from Panama City, Rhein Main AB is located seven miles from the city of Frankfurt, Hickham AFB is within six miles from Honolulu, and Osan is 40 miles from Seoul.

2. Commodities Shipped

Three different commodities have been selected for each route for cost quote comparison purposes. Each route examined will ship a 42 pound package with dimensions of 14 inches in length, 12 inches in width, and nine inches in height (14" x 12" x 9") and a 111 pound package with dimensions of 28" x 18" x 12". These package dimensions are representative of typical vehicle parts, specifically an alternator and a starter motor (TACOM, 1995).

The third commodity selected for each route varies. The commodity designated for shipment to Panama is four pressurized cylinders of compressed oxygen (non-flammable gas and oxidizer). This type of freight is considered to be a hazardous material shipment. The dimensions and weight for the compressed oxygen cylinders are 40" x 56" x 18" at 760 pounds. The commodity selected to be shipped to Germany is a TF-34-400 aircraft engine. This engine is packaged in a canister with dimensions of 140" x 76" x 66" at a weight of 4,040 pounds (Naval Aviation Depot, 1995). The commodity selected to be shipped to Korea is classified SECRET. This shipment consists of two M-1 "special armor" tank skirts, with packaged dimensions of 108" x 88" x 12", and a weight of 880 pounds. This shipment will require constant surveillance service as well as a signature and tally record for purposes of accounting for classified cargo. The last commodity selected to be shipped to Hawaii is a P-3 aircraft propeller with packaged dimensions of 139" x 27" x 29" and a weight of 1300 pounds (Naval Aviation Depot, 1995).

3. AMC Rates

AMC's rate structure for all cargo shipped by channel is subdivided into five weight groups for cost purposes. Table 14 in Chapter VII outlines the different rates per weight break assessed for the four selected routes. AMC rates for all commodities shipped are based on mileage flown, and these rates, depending on the weight of the cargo shipped, are computed by multiplying the rate by the number of pounds shipped. There are no special service charges if the shipment requires special services (e.g., hazardous material, outsize, or ARFCOS shipments). Table 16 outlines AMC rates for the selected commodities per route.

ACTUAL WEIGHTS	ROUTE 1 (SC-PANAMA)	ROUTE 2 (DE-GERMANY)	ROUTE 3 (CA-KOREA)	ROUTE 4 (CA-HAWAII)
42 Pounds	\$43	\$72	\$106	\$44
111 Pounds	\$113	\$190	\$279	\$116
760 Pounds	\$695	\$1,070	\$1,717	\$713
880 Pounds	\$804	\$1,354	\$1,988	\$825
1300 Pounds	\$1,058	\$1,782	\$2,616	\$1,087
4040 Pounds*	\$2,540	\$4,279	\$6,283	\$2,609

(AFR 76-11, 1994)

- * AMC chargeable rates are the greater of the actual or the volume rate. For the commodities selected, the only volume rate higher than the actual weight was for the aircraft engine which was billed at 4064 pounds.

**Table 16. AMC'S Rates for Selected Commodities
Per Route
(Charges rounded to nearest whole dollar)**

4. Alternative Commercial Air Freight Carriers

The commercial air freight carriers selected for rate comparison purposes were Burlington Air Express, Emery Worldwide and Federal Express. These three carriers provide

service to areas within the four selected routes and are considered capable of shipping most of the commodities selected.

B. SCENARIOS

For purposes of this study, price quotations for the specified commodities at specific dimensions and weights for routes one through four were obtained. These single shipment freight rates were based on general commodity rate quotes for airport-to-airport service. These rates represent a price charged to a commercial customer for a one-time shipment and do not include price discounts for high volume customers or combined shipment volume discounts. Airport-to-airport service rates do not include customs clearance. Declared value charges are also not included in the rates obtained. The days required to deliver each shipment to its destination airport varied by the weight of shipment, by carrier, and by route.

1. Route One

The first route examined was from Charleston, South Carolina to Panama City, Panama. Both carriers had airport service centers and material handling equipment located at Charleston and in Panama City to process shipments accordingly. Table 17 outlines the rates that were quoted by

ACTUAL WEIGHT	BURLINGTON	EMERY	FEDEX	AMC
42 Pounds	\$ 25.00 (2-3 days)	\$ 87.50 (3-5 days)	\$ 113.00 (10-14 days)	\$ 43.00 (3.5 days)
111 Pounds	\$ 87.58 (2-3 days)	\$ 124.87 (3-5 days)	\$ 96.20 (10-14 days)	\$113.00 (3.5 days)
760 Pounds Includes HAZMAT charge	\$1,272.50 (2-3 days)	\$1,185.46 (transit time not specified)	\$1,116.16 (4-5 days)	\$695.00 (3.5 days)

(Burlington CSR, 1995, FedEx CSR, 1995 and Emery CSR, 1995)

Table 17. Route One (SC-Panama) Price Quotes

Burlington, Emery and FedEx for each shipment as computed by the commodities actual weight. AMC's channel rate for that specific commodity/route combination is also depicted.

Burlington offered the lowest general commodity rate for destinations to Panama, if no special services were required (i.e., for hazardous or classified materials). Shipment of hazardous materials by Burlington for this route requires utilization of freight forwarding services through contracted airlines, which makes their rates for shipping hazardous material more expensive. A non-hazardous shipment of the 760 pound shipment as specified above would cost \$436.36 to ship through Burlington. This same shipment as a hazardous material shipment requires an air freight cost of approximately \$1,272.50 that includes a \$40 dangerous goods fee and a \$25 handling fee. An additional \$40 to \$75 fee will be assessed by the airline transporting the material. (Burlington CSR, 1995)

Emery and FedEx were competitively priced with AMC for shipments under 150 pounds to Panama. AMC, however, had a slightly lower price for the shipments under 150 pounds or faster transit times to Panama. AMC had a better price than Burlington, Emery and FedEx for the hazardous materials shipment. Emery also assesses an additional \$50 to \$250 service charge based on the airline providing the transportation, and they do not specify a time of transit for this material. The time standards calculated for AMC are based on an AMC possession time from APOE to APOD as outlined by UMMIPS.

2. Route Two

The second route examined was from Dover to Frankfurt, Germany. Emery had airport and material handling services to satisfy origin and destination requirements. Burlington and FedEx did not have sufficient material handling equipment capability for shipping large freight from the Dover, Delaware location; therefore, freight shipments from Dover would require delivery to the airport in Philadelphia. Both

carriers could arrange for shipment from Dover to Philadelphia for an additional charge. Table 18 depicts the three price quotes obtained for the route two scenario.

ACTUAL WEIGHT	BURLINGTON	EMERY	FEDEX	AMC
42 Pounds	\$ 65.10 (2-3 days)	\$ 92.50 (2-5 days)	\$ 81.06 (2-3 days)	\$ 71.86 (3.5 days)
111 Pounds	\$ 114.34 (2-3 days)	\$ 154.16 (2-5 days)	\$ 65.10 (2-3 days)	\$ 189.92 (3.5 days)
4040 Pounds	\$3,165.80 (2-3 days)	\$4,363 (2-5 days)	\$13,026 (4-5 days)	\$4,279 (3.5 days)

(Burlington CSR, 1995, FedEx CSR, 1995 and Emery CSR, 1995)

Table 18. Route Two (DE-Germany) Price Quotes

For this route, Burlington had the least expensive rate for all three commodities. Emery and FedEx had a less expensive rate than AMC for the 111 pound shipment, but were more expensive for the 42 pound and 4,040 pound shipments. The chargeable weight rate for Burlington, Emery and FedEx was calculated at the volume weight at 4,230 pounds for the 4,040 pound aircraft engine. AMC calculates this commodity's chargeable weight to be 4,064 pounds. Emery's rate includes a surcharge for this shipment due to its oversized dimensions (any length over 121 inches or height over 74 inches) and only approximate price quotes were available for oversized pieces.

3. Route Three

The third route examined an origin and destination pair that was closest to AMC's channel flight from Travis AFB, California to Osan AFB, Korea. The closest commercial airports to the Travis location in California is San Francisco for Burlington Air Express, Oakland for Emery Worldwide and San Jose for FedEx. These locations maintained sufficient material handling equipment required for large shipments. The closest commercial airport to Osan in Korea is located in Seoul. The classified material shipment could not be shipped

by Burlington Express because they do not provide service for these types of shipments, and Emery does not provide their constant surveillance services to international destinations. Table 19 depicts the price quotes obtained for the third route scenario.

ACTUAL WEIGHT	BURLINGTON	EMERY	FEDEX	AMC
42 Pounds	\$ 67.60 (2-3 days)	\$ 97.76 (4-5 days)	\$ 98.70 (2-3 days)	\$ 106.00 (4.5 days)
111 Pounds	\$116.84 (2-3 days)	\$193.55 (4-5 days)	\$ 217.56 (2-3 days)	\$ 279.00 (4.5 days)
880 Pounds*	N/A	N/A	\$5,324.35 (4-5 days)	\$1,988.00 (4.5 days)

(Burlington CSR, 1995, FedEx CSR, 1995 and Emery CSR, 1995)

*Classified shipment service price included.

Table 19. Route Three (CA-Korea) Price Quotes

Burlington, Emery and FedEx all had less expensive rates to Seoul for the 42 pound and 111 pound shipments. Their prices would have been less if the shipment did not require special services for a classified shipment. Without this requirement, the price to ship an 880 pound piece with the same dimensions would have cost \$726.18 with Burlington, \$1,234.00 with Emery and \$1,557.60 with FedEx. Burlington does not provide any services for classified shipments. Emery only provides constant surveillance and signature/tally services to within the continental U.S. (not to Alaska or Hawaii), Puerto Rico and to certain locations in Canada. FedEx provides these services through their Sky Courier capability. The Sky Courier service ensures constant surveillance, signature and tally procedures for a classified shipment and costs an additional \$3,766.75. AMC is less expensive when shipping classified freight.

4. Route Four

The fourth route examined was from Travis AFB, California to Hickham AFB, Honolulu, Hawaii. Again, the shipments originated from San Francisco for Burlington, Oakland for Emery Worldwide and San Jose for Federal Express. Burlington, Emery, and Federal Express shipments to Hawaii normally include door-to-door services at no extra charge for domestic shipments including shipments to Oahu, Hawaii. Table 20 depicts the price quotes obtained.

ACTUAL WEIGHT	BURLINGTON'	EMERY'	FEDEX'	AMC''
42 Pounds	\$ 86.25 (2 days)	\$ 96.10 (3-4 days)	\$ 62.00 (2 days)	\$ 44.00 (3.5 days)
111 Pounds	\$ 210.90 (2 days)	\$ 204.50 (3-4 days)	\$ 125.44 (2 days)	\$ 116.00 (3.5 days)
1300 Pounds	\$2,340.00 (2 days)	\$3,794.90 (3-4 days)	\$4,666.66 (2 days)	\$1,087.00 (3.5 days)

(Burlington CSR, 1995, FedEx CSR, 1995 and Emery CSR, 1995)

* Door-to-Door Service

** Airport-to-Airport Service

Table 20. Route Four (CA-Hawaii) Price Quotes

For domestic shipments to Hawaii, AMC's rates appear less expensive. However, their rate does not include door-to-door service which would require additional transportation time and charges. For airport-to-airport services, the commercial carriers' general commodity rates are competitively priced with AMC. Even though the commercial rate is slightly higher, the transit times for these shipments are less than AMC when transported by Burlington or FedEx. The commercial rates for the 1300 pound shipment is almost four times more expensive than AMC's rate. The increased expense is attributed to the oversized dimension charges required by Burlington Express. Emery Worldwide's rate consists of a \$2,919.15 transportation

charge and an \$875.75 oversized service charge.³¹ FedEx assesses an additional charge for domestic shipments with any dimension over 119 inches. FedEx had the highest price for shipping heavier weight items. AMC appears to have a better rate for dimensionally oversized pieces.

5. Government Tender Rates

Emery Worldwide and Federal Express also have government tender (standing contract offer) rate schedules with AMC for shipping government freight at a discounted rate. Burlington has rate tenders with DOD for domestic traffic and is currently working on another for international destinations (BGSA, 1995). These contracted rates are for express door-to-door services and customs clearance.

AMC channel rates do not reflect door-to-door shipping costs, only APOE to APOD. Extra charges are assessed if a shipment requires pick up/delivery and delivery to destination. If freight shipments were performed under a door-to-door air shipment scenario, the cost to transport cargo with AMC organic lift assets would be more than shipping with most commercial carriers at their negotiated tender rates. A 1994 analysis, conducted by the Air Force Logistics Management Agency (AFLMA), indicated that commercial tender rates for shipments less than 150 pounds averaged 13 percent less than AMC's rates for door-to-door shipping requirements. For shipments greater than 150 pounds, these tender rates averaged over 22 percent less expensive. (AFLMA, 1994) AMC performance times for door-to-door services were two to four times longer than comparable commercial door-to-door services. They were also up to three times longer than if shipped from APOE

³¹It is important to note that a business making this same shipment through Emery would be eligible for Emery's daily discount rate. This rate is considerably lower and is considered valid for 24 hours from the time it is quoted. This particular quote at the daily discount rate would have been a total cost of \$1,906.32. (Emery CSR, 1995)

to APOD according to UMMIPS time standards. (DOD 4140.1-R, 1993, p. 5-22) However, not all commercial services are available to all locations and certain commodities are restricted.

IX. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

A. SUMMARY

The Air Force's channel flight system provides expedited air transportation for DOD domestic and international priority shipments. Maintenance of this system is important during the day-to-day military airlift operations but becomes even more critical during crisis situations where DOD is totally dependent on military airlift assets. AMC's performance is required during conditions of conflict. Their ability to respond to essential mission need situations, e.g., air landings in less than perfect airport and runway situations, is a requirement that most commercial air companies would not respond to.

B. CONCLUSIONS

There is no acceptable commercial substitute for military airlift requirements in a time of conflict. AMC must maintain airlift capabilities commensurate with contingency requirements specified by the unified and specified commands through the Joint Chiefs of Staff (JCS). In addition, sensitive and classified air cargo may require the use of military airlift exclusively to protect vital national interests. Certain commodities, e.g., aircraft and combat vehicles, can only be accommodated in military aircraft specifically designed for such cargo.

Commercial air freight carriers have the assets and lift capacity to ship vast amounts of cargo to the majority of international destinations. They offer a viable alternative for DOD transportation requirements, servicing a wide variety of commodities within certain dimensional and hazard risk restrictions.

The commercial air freight carrier's most expensive shipping rates, called general commodity rates, were used for comparison with AMC channel flight rates. The military does, however, have standing contract air freight rates, called

tenders, with many of the commercial air freight carriers that offer transportation of cargo at significantly lower costs. These costs normally include customs clearance, and door-to-door servicing for delivery overnight and second day. The commercial tender rates provided to the government include other services that would normally require an extra charge and a longer transit time if transported by military assets.

According to the UMMIPS time standards, a door-to-door shipment should not have a transit time longer than a range from nine to thirteen days depending on the destination area. This range includes the time a requisition with an RDD of 999 is submitted until the time it is received and processed (DOD 4140.1-R, 1993). Other priority shipments would require more transit time. These door-to-door services are approximately three times longer than the airport-to-airport (AMC possession time) transit times used for comparisons in Chapter VIII.

Large quantities of hazardous material and certain classified cargo may only be accommodated by AMC and would be considerably more expensive when available on commercial assets. Commercial carriers are also limited by the construction and size of their aircraft. AMC clearly can handle larger and more oddly shaped cargo through the use of the C-5 and C-17 aircraft.

From a strictly peacetime business viewpoint, AMC channel cargo rates are comparable to the most expensive commercial general commodity rates, which are based on a one-time shipment of a single package. These rates do not include possible discounts available through the commercial air freight system, e.g., discounts for consolidating shipments to one destination or for a high volume customer, which are available to most commercial account agreements. These discounts are significantly less expensive (almost 50 percent) than conducting business with a carrier for a one-time only arrangement. When these existing discounts are compared to the AMC rates, the

commercial carriers appear to offer a monetary advantage for shipping unclassified cargo within certain parameters.

Emery Worldwide, for example, will provide cargo transportation at what they consider their daily discounted rate, even if the shipper does not have an account with them, hoping to capture their current shipping business needs as well as possible future market share. High volume shippers with accounts are provided even further discounts. There are similar discount arrangements with the other competitive commercial air freight carriers as well. Air freight transportation is a business for commercial carriers, and they are dedicated to providing the best service at a competitive rate, otherwise they will go out of business.

A cost comparison of the highest commercial rates to AMC channel cargo traffic rates with the selected commodities indicates that AMC is the lower rate freight carrier for shipment routes to Hawaii. However, the selected commercial carriers' rates were competitive to AMC's rates, and also included door-to-door delivery servicing. AMC rates are only based on APOE to APOD transportation. At least one carrier would offer a lower rate than AMC's to all of the other international locations depicted.

Commercial carriers remain competitive through economies of scale in providing better, i.e., cheaper, rates for certain routes. This provides them a competitive edge in the market. Commercial rates are also competitive in shipping oversize cargo. Hazardous material shipments performed within and outside IATA regulations (e.g., shipments in large quantities or explosives) as well as classified material shipments are not accommodated or require a much higher service charge rate that AMC does not require. AMC clearly has an advantage for shipping these types of cargoes.

Commercial air freight rates are subject to market conditions and could radically change during periods of conflict. As the risk increases or demands for cargo at certain destinations increase, freight rates will follow. AMC freight rates

for military or CRAF assets are not subject to market pressures and remain stable.

C. RECOMMENDATIONS

The following recommendations are offered to improve the DOD's air freight planning and operations. Implementation of similar practices for determining whether to use AMC or commercial air freight operations will result in a significant monetary savings. Specific recommendations are:

- Maintain the capability to respond to all JCS identified contingencies with AMC military aircraft and CRAF assets.
- Maintain AMC's capability to airlift classified/sensitive information and cargo relating to U.S. national security interests due to AMC's capability of transporting such items at a cost effective rate.
- Maintain AMC's capability to airlift hazardous materials due to their ability to transport these items outside IATA regulations and in large amounts when required.
- Contract with commercial airfreight carriers for transporting DOD air freight, including oversized items, due to their better customer service capabilities and cost effective pricing whenever practicable.
- Review other studies in conjunction with this thesis to determine which carriers will provide the best rates and services to the routes heavily utilized by AMC channel flights.

AMC is a DOD airlift asset that must be maintained for contingency purposes; however, cost effective decisions are important to shrinking budgets. Using alternative commercial carriers allows DOD to tailor and reduce their air cargo expenditures to accommodate competing demands for fast and available transportation.

APPENDIX A. ACRONYMS

AB	Air Base
ABX	Air Borne Express
AFB	Air Force Base
AFLMA	Air Force Logistics Management Agency
AFR	Air Force Regulation
ALS	Advanced Logistics Service AMC Air Mobility Command
APO	Army Post Office
APOD	Air Port of Debarkation
APOE	Air Port of Embarkation
ARC	Air Reserve Component
ASIFICS	Airlift Service Industrial Fund Integrated Computer System
ATA	Airport-to-Airport
BAX	Burlington Air Express
BLS	Business Logistics Services
CF	Consolidated Freightways
CFR	Code of Federal Regulations
COD	Collect on Delivery
CONUS	Continental United States
CRAF	Civil Reserve Air Fleet
DOD	Department of Defense

EDI	Electronic Data Interchange
EWA	Emery Worldwide Airlines
EWV	Emery Worldwide
FCL	Full Container Load
FedEx	Federal Express
FIFO	First-in-First-out
FMS	Foreign Military Sales
FPO	Fleet Post Office
FY	Fiscal Year
HAZMAT	Hazardous Material
IATA	International Air Transportation Association
IAW	In Accordance With
IP	International Priority
IPD	International Priority Distribution
IXF	International Air Freight
JCS	Joint Chiefs of Staff
LCL	Less Than Container Load
LVS	Low Value Shipment
OCONUS	Outside of Continental United States

OSA	Operational Support Airlift
OSD	Office of the Secretary of Defense
RDD	Required Delivery Date
SAAM	Special Airlift Assignment Mission
SAM	Special Air Mission
SDS	Select Delivery Service
TACC	Tanker Airlift Control Center
TACOM	U.S. Army Tank Automotive and Armaments Command
TCMD	Transportation Control Movement Document
TP	Transportation Priority
TRAIS	Transportation Reporting And Inquiry System
UMMIPS	Uniform Material Movement and Issue Priority System
UPS	United Parcel Service
U.S.	United States
USA	United States of America
USPS	U.S. Postal Service
USTRANSCOM	U.S. Transportation Command

APPENDIX B. AIR FREIGHT DATA MATRIX¹

	VOLUME MILLION TONS	NUMBER OF SHIPMENTS (MILLION)	AIRCRAFT	EMPLOYEES	REVENUE (\$)	ASSETS (\$K)	CUSTOMER TRACKING CAPABILITIES ²	NUMBER OF COUNTRIES SERVED	% OF REVENUES (DOMESTIC)
FedEx	1.721	N/A	462	101,000	8,479,456	5,992,498	Yes	187	73%
ABX	.469	164	90	15,800	1,719,981	1,006,909	Yes	200	86%
BAX	.510	N/A	24	5,500	998,079	418,694	Yes	160	46%
EMW	.500	6.7	71	7,500	1,261,273	907,755	Yes	180	N/A
DHL	N/A	71	150	29,000	3,000,000	N/A	Yes	221	N/A
UPS	N/A	2,940	524	303,000	17,782,353	9,573,831	Yes	180	89%
AMC	.253	N/A	349 ³	121,938	N/A	N/A	No	N/A	N/A

¹Appendix B data is based on information presented in Chapter II through VII. Information is also based on FY 93 and 94 company literature and statistics.

²Company will provide customer with computer software of systems for tracking their own shipments.

³This number of aircraft does not include AMC Refueling Aircraft (502) and Other Aircraft (100).

LIST OF REFERENCES

Air Mobility Command Flight Plan, Air Mobility Command, 1994.

Airborne Express Service Around the World, Canada, Mexico, and International Express Rate Schedules, February 1994.

Airborne Express 1994 Service Guide, Airborne Freight Corporation, 1993.

Airborne Freight Corporation, United States Security and Exchange Commission Form 10-K, Annual Report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934. Commission File No. 1-6512 for fiscal year ended December 31, 1993.

Airlift, "MAC Cargo Airlift in a Nutshell," Captain Randy Harvey, Captain Shirley Poff, HQ, Military Airlift Command, (MAC), Vol. IX, No. 3, pp. 18-21, Fall 1987.

AMC Vital Statistics, HQ, Air Mobility Command, October 1994.

Brief History of the Air Mobility Command, Air Mobility Command, August 1994.

Burlington Air Express, Company Profile, 1994.

Burstiner, Marcy, "Transport Giant Finally Nearing Its Destination," San Francisco Business Times, Vol. 8, No. 4, pp. 1-3, San Francisco Business Times, Inc., September 24, 1993.

Consolidate Freightways, Inc., U.S. Security and Exchange Commission Form 10-K, Annual Report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934. Commission File No. 132-3, for fiscal year ended December 31, 1993.

Consolidate Freightways, Inc., U.S. Security and Exchange Commission Form 10-Q, Annual Report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934. Commission File No. 132-3, for quarterly period ended June 30, 1994.

Consolidated Freightways Incorporated Annual Report to Shareholders, 1993.

Department of the Air Force, Air Force Logistics Management Agency (AFLMA), Letter Report MICAP Movement Analysis, Project Manager, Captain E. Joan Scarpa, Project Number LT 9404910 ALFMA/LG4, Maxwell AFB, GunterAmex, AL, February 1994.

Department of the Air Force, Air Force Regulation 76-11, U.S. Government Rate Tariffs, August 1994.

Department of Defense, Department of Defense Directive 4140.1-R, DOD Material Management Regulation, January 1993.

Department of Defense, Department of Defense Directive 4515.13-R, Air Transportation Eligibility, January 1980.

Department of Defense, Department of Defense Directive 4500.32-R, Military Standard Transportation and Movement Procedures (MILSTAMP), 15 March 1987.

DHL Quick Reference Guide, DHL Worldwide Express, DHL Airways, Inc., 1994.

Distribution Staff, "A New Dimension," Distribution, Vol. 93, No. 4, p. 22, Chilton Company, April 1994.

Distribution Staff, "Emery Returns to Profitability," Distribution, Chilton Company, February 1994.

Emery Worldwide Customer Service Guide, Emery Worldwide Headquarters, Palo Alto, CA, April 1992.

Emery Worldwide Fact Sheet, News Release, Emery Worldwide, 19 August 1994.

FACTS: United Parcel Service, UPS Public Relations, September 1994.

Federal Express Corporation, U.S. Security and Exchange Commission Form 10-K, Annual Report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934. Commission File No. 1-7806 for fiscal year ended May 31, 1994.

Federal Express Service Guide, The Wells Group, Minneapolis, MN, July 1993.

Fedex Annual Report, Federal Express Corporation, 1994.

FY93 Cargo/Mail Traffic Moved by Crannel Recap Summaries (Tons) (MICRO376), Airlift Service Industrial Fund Integrated Computer System, Air Mobility Command (AMC), 9 April 1994.

FY93 Channel Cargo Broken Out by Special Handling Code, Transportation Reporting and Inquiry System (TRAIS), FY93SHCD.XLS, 25 February 1995.

FY93 Channel Cargo Moved Worldwide Broken Out by Commodity Codes, Transportation Reporting and Inquiry System (TRAIS), COMCDES.XLS, June 1994.

FY93 Channel Cargo Percentage of Hazmat and Outsized Cargo, Transportation Reporting and Inquiry System (TRAIS), Lewis 295.XLS, 21 February 1995.

Lefer, Henry, "Poised to Pounce on Recovery," Air Transport World, Vol. 31, No. 2, pp. 101-104, Penton Publishing, Inc., February 1994.

Lefer, Henry, "Back from the Bunk," Air Transport World, Vol. 31, No. 5, pp. 105-108, Penton Publishing, Inc., May 1994.

Listing of CRAF Contractors, Air Mobility Command, CARLIST.XLS, December 1994.

Moody's Corporate Profiles, 1994 Moody's Investors Services Inc., Dialog Information Services, Inc.

Muller, Gerhardt, Intermodal Freight Transportation, Second Edition, ENO Foundation for Transportation, 1989, p. 3.

Page, Paul, "Emery Worldwide Plans 7.2 Percent Rate Hike in January," Knight-Ridder/Tribune Business News, Knight-Ridder/Tribune Business News, December 19, 1993.

"Tanker Airlift Control Center Backgrounder," Air Mobility Command Fact Sheet, HQ, Air Mobility Command, August 1994.

Telephone conversation between Mr. Burgess, Pricing Division, Emery Headquarters, Palo Alto, CA, and the author, 22 December 1994.

Telephone conversation between Mr. McDonald, Cargo Management Branch, Air Mobility Command, and the author, 16 December 1994.

Telephone conversation between Ms. Carol Sweeney, Government Logistics Coordinator, Emery Worldwide, and the author, 3 February 1995.

Telephone conversation between UPS Customer Service Agent, United Parcel Service, and the author, 22 December 1994.

Telephone conversation with Burlington Air Express, Government Service Agent, Burlington Air Express Government Services, and the author, 25 January 1995.

Telephone conversation with DHL Customer Service Representative, DHL Worldwide Express, and the author, 6 January 1995.

Telephone conversation with Domestic and International Customer Service Representatives, Burlington Air Express, and the author, 24 January 1995.

Telephone conversation with Domestic and International Customer Service Representatives, Emery Worldwide, and the author, 24 January 1995.

Telephone conversation with LTC B. Naegle, U.S. Army Tank Automotive and Armament Command, Warren, MI, and the author, 13 January 1995.

Telephone conversation with International and Domestic Customer Service Representatives, Federal Express, and the author, 23 January 1995.

Telephone conversation with Mr. Duck, Business Department Naval Aviation Depot, Alameda, CA, and the author, 11 January 1995.

The World Starts Here DHL Worldwide Express, DHL Airways, Inc., 1993.

The Pittston Company U.S. Security and Exchange Commission Form 10-K, Annual Report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934. Commission File No. 1-9148, for fiscal year ended December 31, 1993.

United Parcel Service 1993 Report to Shareowners, United Parcel Service of America, Inc., April 1994.

UPS Air Service Guide, United Parcel Service, October 1993.

UPS Air Services Rate/Zone Chart, United Parcel Service, February 1994.

UPS International Air Service Guide, United Parcel Service, February 1992.

UPS Rate Chart, United Parcel Service, February 1994.

UPS Service to Canada and Mexico Guide, United Parcel Service, November 1993.

UPS Parcel Service "Key Updates in UPS History," UPS Public Relations, September 1994.

1993 Airborne Express Annual Report, Airborne Freight Corporation, 1994.

1993 Annual Report Pittston Services Group, The Pittston Company.

1994 Worldwide Service Guide, Burlington Air Express.

1995 Air Mobility Master Plan, Air Mobility Command, U.S. Government Printing Office, October 1994.

BIBLIOGRAPHY

- Chitwood, Gregory B., "Quicktrans and Alternative Commercial Transportation: A Cost Comparison," Master's Thesis, Naval Postgraduate School, Monterey, CA, December 1992.
- Dangerous Goods Regulations, 1994 International Air Transport Association, IATA Resolution 618, Attachment "A," Montreal-Geneva, 35th Ed., 1994.
- Hazardous Materials Handling Handbook, School of Military Packaging Technology, Aberdeen Proving Ground, MD, February 1987.
- Hildegard, La. Sacarello, The Comprehensive Handbook of Hazardous Materials, Lewis Publishers, CRC Press, Inc., Boca Raton, FL, 1994.
- Telephone conversation with Mr. Steffey, Cargo Management Branch, Air Mobility Command, and the author, 21 February 1995.
- Title 49 of the Code of Federal Regulations, Part 175, October 1, 1993.

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center 2
Cameron Station
Alexandria, VA 22304-6145
2. Library, Code 52 2
Naval Postgraduate School
Monterey, CA 93943-5101
3. Defense Logistics Studies Information Exchange . . . 1
U.S. Army Logistics Management Center
Fort Lee, VA 23801-6043
4. Military Sealift Command 1
Code N14
Washington, DC 20398-5100
5. Professor Dan Boger, Code SM/Bo 1
Naval Postgraduate School
Monterey, CA 93943-5103
6. Professor K. J. Euske, Code SM/Ee 3
Naval Postgraduate School
Monterey, CA 93943-5103
7. LT Theresa A. Lewis 2
196 Lloyd Drive
Livermore, CA 94550